

THE JOURNAL OF MEDICAL EDUCATION

OFFICIAL PUBLICATION OF
THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES



OCTOBER 1961 • VOLUME 36 • NUMBER 10

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A New Book! | Perez-Tamayo — Mechanisms of Disease

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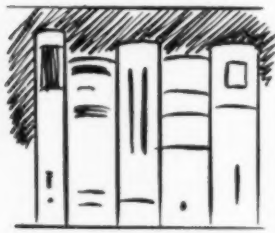
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By Talmage L. Peele, M.D., Associate Professor of Anatomy in Charge of Neuroanatomy, Assistant Professor of Neurology, Duke University Medical Center, 662 pp., 7 $\frac{1}{4}$ x 9 $\frac{1}{8}$, 351 illus., \$16.00.

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This widely adopted text follows the modern trend in medicine by dealing with disease entities in the light of their symptomatology, abnormal physiology, pathology, chemistry, and psychology.

PRINCIPLES OF BIOCHEMISTRY, 2nd Ed.

By A. White, Ph.D.; P. Handler, Ph.D.; E. Smith, Ph.D.; D. Stetten, Jr., M.D., Ph.D.; 1149 pp., 6 x 9, illus., \$15.00.

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By DONALD M. PILLSBURY, M.A., D.Sc., (Hon.), M.D., F.A.C.P., Professor and Director of Department of Dermatology, University of Pennsylvania School of Medicine; WALTER B. SHELLEY, M.D., Ph.D., F.A.C.P., Professor of Dermatology, University of Pennsylvania; and ALBERT KLIGMAN, M.D., Ph.D., Professor of Dermatology, University of Pennsylvania. 430 pages, 6" x 9¼" with 234 illustrations. \$9.50.

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THE JOURNAL OF MEDICAL EDUCATION

Official Publication of the Association of American Medical Colleges

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The Journal of Medical Education is owned and published by the Association of American Medical Colleges and printed monthly by Service Printers, Inc., 120 N. Green St., Chicago 7, Illinois. Second-class postage paid at Chicago, Illinois.

Subscription Rates: \$7.00 per year, \$13.50 two years, \$19.50 three years, \$1.00 per single copy; foreign, \$8.00 per year, \$15.50 two years, \$22.50 three years, \$1.25 per single copy; Pan America and Canada, \$7.50 per year, \$14.50 two years, \$21.00 three years. Supplements, \$2.00.

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The Journal of Medical Education serves as an international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs, and problems of the Association. The Editorial Board welcomes the submission of manuscripts concerned with the broad field of medical education: this includes preparation for medical education; the medical school experience; intern and resident education; graduate and postgraduate medical education. The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators, and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

Manuscripts should be submitted in duplicate. All manuscripts are reviewed by the Editorial Board before acceptance for publication. All copy, including footnotes, tables, and legends, should be typed double-spaced. Each diagram or graph or photograph should have a brief legend. Each table should be typed on a separate sheet of paper. References should refer to published material only, must be submitted in alphabetical order, and should include, in order: author, title, journal abbreviation (*Quarterly Cumulative Index Medicus* form), volume number, page, and year; book references should also include editors, edition, publisher, and place of publication.

Galley proofs will be mailed to authors for correction before publication and should be returned within 48 hours after receipt.

Reprints may be ordered, when galley proofs are returned, in multiples of 100, at a price depending on the length of the article; prices are listed on the reprint order form.

Medical Education Forum includes editorials, letters, comments, criticisms, and excerpts from important addresses.

News from the Medical Schools: Material for this section should be transmitted to the News Editor, Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

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Address all correspondence concerning news, announcements, and personnel exchange to the office of the Association of American Medical Colleges, c/o Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois; address all correspondence concerning advertising to Miss Helen Claire Herman, 2530 Ridge Avenue, Evanston, Illinois.

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A NEW BOOK ON

THE DISSEMINATION OF CANCER: PREVENTION AND THERAPY

By WARREN H. COLE, M.D., GERALD O. McDONALD, M.D.,
STUART S. ROBERTS, M.D., and HARRY W. SOUTHWICK, M.D.

Department of Surgery, University of Illinois
College of Medicine, Chicago, Illinois

As long as the mechanisms responsible for the development of cancer cells and their invasion of normal tissue remain a mystery thousands of lives will be saved and unnecessary suffering diminished by utilizing every bit of available information to help the afflicted patient. Every line of this book has been written to serve this goal. Dr. Cole, past president of the American Cancer Society, and his colleagues bring years of experience and research on the nature of cancer and its dissemination to this most important new book.

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Other chapters deal with dissemination through local invasion, the lymphatic system, implantation, venous spread, the importance of stress and the possibility of resulting reduced resistance to formation of metastases, the antigenic nature of cancer cells, chemotherapeutic methods to control dissemination, and some specific preventive measures to be taken during treatment and surgery.

October 1961

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Wyeth plays no part in the selection of recipients. Awards are made according to recommendations of the Selection Committee, composed of distinguished physicians in active pediatric service. Requests for application or further information should be addressed to the committee chairman: Philip S. Barba, M.D., School of Medicine, University of Pennsylvania, Philadelphia 4, Pa.

Wyeth Laboratories Philadelphia 1, Pa.

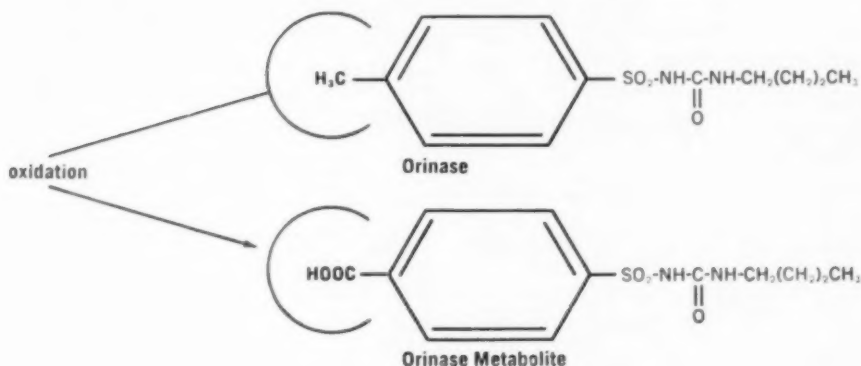


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Calendar of Meetings

ASSOCIATION OF AMERICAN

MEDICAL COLLEGES

72nd Annual Meeting, Nov. 13-15, 1961

Queen Elizabeth Hotel, Montreal, Canada

1961

OCTOBER

AMERICAN COLLEGE OF GASTROENTEROLOGY, Hotel Cleveland, Cleveland, Oct. 22-25. Mr. Daniel Weiss, 33 West 60th St., New York 23, Executive Director.

AMERICAN SOCIETY OF ANESTHESIOLOGISTS, INC., Statler Hilton, Los Angeles, Oct. 22-27. Mr. John W. Andes, 515 Buase Highway, Park Ridge, Ill., Executive Secretary.

AMERICAN SOCIETY OF MICROBIOLOGY, Commodore Hotel, New York City, Oct. 31-Nov. 2. R. W. Sarber, 19875 Mack Ave., Detroit 36, Executive Secretary.

NOVEMBER

AMERICAN COLLEGE OF CHEST PHYSICIANS, Interim Session, Brown-Palace Hotel, Denver, Nov. 25-27. Mr. Ward Bentley, 112 E. Chestnut St., Chicago 11, Executive Assistant.

AMERICAN MEDICAL ASSOCIATION, CLINICAL MEETING, Denver, Nov. 27-30. Dr. F. J. L. Blasingame, 535 N. Dearborn, Chicago 10, Executive Vice-President.

AMERICAN MEDICAL WOMEN'S ASSOCIATION, Cleveland, November. Miss Lillian T. Majally, 1790 Broadway, New York 19, Executive Director.

AMERICAN PUBLIC HEALTH ASSOCIATION, Cobo Hall, Detroit, Nov. 13-17. Dr. Berwyn F. Mattison, 1790 Broadway, New York 19, Executive Director.

ASSOCIATION OF MILITARY SURGEONS (68TH ANNUAL CONVENTION), Mayflower Hotel, Washington, D.C., Nov. 5-8. Col. Robert E. Bitner, U.S.A., Ret., 1726 Eye St., N.W., Washington 6, D.C., Secretary.

CONFERENCE ON GRADUATE MEDICAL EDUCATION, Nov. 30-Dec. 1. Dr. Paul Nemir, Jr., Dean, Graduate School of Medicine, University of Pennsylvania, Philadelphia 4.

INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA, Cleveland Auditorium, Cleveland, Nov. 13-16. Mr. Roy T. Ragatz, Box 1109, Madison 1, Wis., Executive Director.

DECEMBER

AMERICAN ACADEMY OF DERMATOLOGY AND SYPHILOLOGY, Palmer House, Chicago, Dec. 2-7. Dr. Robert R. Kierland, Mayo Clinic, Rochester, Minn., Secretary-Treasurer.

1962

JANUARY

AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS, Palmer House, Chicago, Jan. 27-Feb. 1. Mr. John K. Hart, 29 East Madison St., Room 910, Chicago 2, Executive Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING FOR SURGEONS AND GRADUATE NURSES, Statler-Hilton and Biltmore Hotels, Los Angeles, Jan. 29-Feb. 1. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

FEBRUARY

AMERICAN ACADEMY OF ALLERGY, Denver-Hilton Hotel, Denver, Feb. 5-7. Mr. James O. Kelley, 756 North Milwaukee St., Milwaukee 2, Wis., Executive Secretary.

AMERICAN COLLEGE OF RADIOLOGY, Roosevelt Hotel, New York City, Feb. 7-10. Mr. William C. Stronach, 20 N. Wacker Dr., Chicago 6, Executive Director.

CONGRESS ON MEDICAL EDUCATION AND LICENSURE, Palmer House, Chicago, Feb. 3-6. Dr. Walter S. Wiggins, 535 N. Dearborn St., Chicago 10, Director, AMA Council on Medical Education and Hospitals.

SOCIETY OF UNIVERSITY SURGEONS, Cleveland, Ohio, Feb. 8-10. Dr. C. Frederick Kittle, University of Kansas Medical Center, Kansas City 12, Kansas.

MARCH

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING, Sheraton-Cadillac Hotel, Detroit, March 5-7. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING, Hotel Peabody, Memphis, Tenn., March 26-28. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

APRIL

AEROSPACE MEDICAL ASSOCIATION, Atlantic City, April 9-12. Dr. William J. Kennard, Washington National Airport, Washington 1, D.C., Executive Vice-President.

AMERICAN ACADEMY OF GENERAL PRACTICE, Las Vegas, Nev., Apr. 6-13. Mr. Mac F. Cahal, Volker Blvd., at Brookside, Kansas City 12, Mo., Executive Director.

AMERICAN ACADEMY OF NEUROLOGY, Statler-Hilton Hotel, New York City, April 23-28. Mr. Thomas D. Sweden, 4307 E. 50th St., Minneapolis 17, Executive Secretary.

AMERICAN ACADEMY OF PEDIATRICS, spring meeting, Statler-Hilton, New York City, Apr. 30-May. Dr. E. H. Christopherson, 1801 Hinman Ave., Evanston, Ill., Executive Director.

AMERICAN COLLEGE OF ALLERGISTS, Hotel Radisson, Minneapolis, April 1-6. Dr. Maurice C. Barnes 1310 Austin Ave., Waco, Texas.

AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS, Palmer House, Chicago, Apr. 2-5. Mr. Donald F. Richardson, 79 W. Monroe St., Chicago 3, Executive Secretary.

AMERICAN COLLEGE OF PHYSICIANS, Bellevue-Stratford Hotel, Philadelphia, April 9-13. Dr. Edward C. Rosenow, Jr., 4200 Pine St., Philadelphia 4, Executive Director.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING, Sheraton-Park Hotel, Washington, D.C., April 16-18. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

AMERICAN FEDERATION FOR CLINICAL RESEARCH, Haddon Hall, Atlantic City, N.J., April 29. Mr. James E. Bryan, 250 West 57th St., New York 19, Executive Secretary.

New 1961 Book**Multiple-choice Examinations in Medicine***A Guide for Examiner and Examinee***By JOHN P. HUBBARD, M.D.**

Professor and Head of the Department of Public Health and Preventive Medicine,
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and WILLIAM V. CLEMANS, Ph.D.

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A Textbook of Histology**By JOHN C. FINERTY**

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5th Edition. 573 Pages, 7" x 10". 502 Illus. on 374 Figs., 18 in Color. \$11.00.

A Textbook of Neurology**By H. HOUSTON MERRITT, M.D.**

Acting Dean of the Faculty of Medicine and Professor
 of Neurology, Columbia University

Dr. Merritt presents diseases of the nervous system on an etiological basis in this text written for 3rd and 4th year medical students. Practitioners, internists, neurologists and psychiatrists will find it has much of value to them in their practices. There are full discussions of infections, vascular lesions, tumors, trauma, degenerative and hereditary degenerative diseases, diseases due to toxins, and metabolic diseases.

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(1) Matthias, J. Q.; Misiewicz, J. J., and Scott, R. B.: *Brit. M. J.* 2:1837-1840 (Dec. 24) 1960.

(2) Coggins, P. R.; Ravdin, R. G., and Eisman, S. H.: *Cancer* 13:1254-1260 (Nov.-Dec.) 1960.

(3) Papac, R.; Petrakis, N. L.; Amini, F., and Wood, D. A.: *J.A.M.A.* 172:1387-1391 (March 20) 1960.

DOSAGE: For neoplasms relatively susceptible to Cytoxan—Patients with lymphomas and other neoplasms believed to be relatively susceptible to Cytoxan therapy are given an initial dose of 2-3 mg./Kg./day intravenously. White blood counts and platelet determinations should be made daily or twice weekly and the dosage adjusted accordingly. Intravenous infusions should be continued for at least 6 days unless otherwise indicated. A leukopenia of between 1500 and 5000 cells per cu. mm. (or lower) may be expected between the tenth and fourteenth day. In the presence of a leukopenia of less than 2000/cu. mm. Cytoxan should be discontinued until the white cell count returns to 2000 to 5000 (usually within a week). Dosage is subsequently adjusted as indicated by the patient's objective response and the leukocyte count. If the patient is subjectively improved, if the size of the tumor has decreased, or if the white cells are satisfactorily maintained between 2000 and 5000/cu. mm. oral dosage may be instituted equivalent to intravenous dosage.

Thrombocytopenia is rarely observed on this regimen. If platelet counts of less than 100,000/cu. mm. are observed, the patient should be watched carefully. If platelets continue to decrease, Cytoxan should be discontinued.

The patient who has had previous treatment with alkylating agents, or x-ray, or is debilitated may be more susceptible to bone marrow depression, and initial Cytoxan doses should be more conservative than the above. Such patients should have more frequent hematologic evaluation. Good medical practice demands access to a reliable hematologic laboratory when using Cytoxan.

For neoplasms relatively resistant to Cytoxan—Patients with carcinomas and other malignant neoplasms believed to be less susceptible to Cytoxan therapy are given a dose of 4 to 8 mg./Kg./day intravenously. Unless there are indications to the contrary, this dose is continued for 6 days, then stopped. Leukopenia usually ensues on the tenth to fourteenth day after the first dose of Cytoxan. Thrombocyte reduction is not common, and platelets may actually increase. The leukocyte count promptly returns toward normal levels in most cases, and as it begins to increase, sufficient Cytoxan is administered to maintain it near 2000 to 5000/cu. mm. This may be accomplished by two intravenous injections weekly, or by oral administration, or by a combination of both routes. An oral dosage of 50 to 200 mg. daily or an intravenous injection of 5 mg./Kg. twice weekly will usually suffice.

The platelet and leukocyte counts should be followed carefully, and the prior treatment history of patients carefully evaluated as delineated above.

Leukopenia as a guide to adequacy of dosage—The best objective measure for dosage seems to be the number of circulating white blood cells. This is used as an index of the activity of the hematopoietic system, especially the bone marrow. The mechanism by which Cytoxan causes a reduction in the level of white blood cells is not known, but cessation of dosage results in an increase in the level, indicating that the hematopoietic system had not been permanently affected. When large doses (8 mg./Kg./day for 6 days) are given initially, the white cell count falls rapidly. Following the cessation of the 6-day course, the white cells may continue to decline for as long as 8 days and then increase. The reduction of the white cell count during Cytoxan therapy and its subsequent increase when therapy is discontinued can be repeated in the same patient. Maximal reduction in leukocyte count indicates the maximal permissible Cytoxan level for therapeutic effect. Leukopenic patients must be watched carefully for evidence of infection.

Total white blood cell and thrombocyte counts should be obtained 2 or more times weekly in order to evaluate therapy and to adjust dosage.

SIDE EFFECTS: Although Cytoxan is related to nitrogen mustard, it has no vesicant effect on tissue. It does not traumatize the vein when injected intravenously, nor does it cause any localized tissue reaction following extravasation. It may be administered intravenously, intramuscularly, intraperitoneally, intrapleurally or directly into the

tumor, when indicated. It is apparently active by each of these routes.

Nausea and vomiting are common and depend on dose and on individual susceptibility. However, many investigators accept the nausea and vomiting in favor of maintaining maximal therapy. The vomiting can be controlled with antiemetic agents.

Alopecia is a frequent side reaction to Cytoxan therapy. It has been observed in 28% of the patients studied in this country. The incidence is greater with larger doses. The loss of hair may first be noted about the 21st day of therapy and may proceed to alopecia totalis. This effect is reversed following discontinuance of Cytoxan; during reduced maintenance therapy, hair may reappear. It is essential to advise the patient in advance concerning this effect of the drug.

Dizziness of short duration and of minor degree has occasionally been reported.

Leukopenia is an expected effect and can be used as a guide to therapy. Thrombocytopenia may occur, especially after large doses. The leukocyte or platelet counts of an occasional patient may fall precipitously after even small doses of Cytoxan, as with all alkylating agents. The drug should be discontinued in such patients and reinstituted later at lower dosage after satisfactory hematologic recovery has occurred. Prior treatment with x-ray or with other chemotherapeutic agents frequently causes an earlier or exaggerated leukopenia or thrombocytopenia after Cytoxan medication. Only rarely has there been a report of erythrocyte or hemoglobin reduction.

ADMINISTRATION: Add 5 cc. sterile water (Water for Injection, U.S.P.) to 100 mg. of Cytoxan in the sterile vial (add 10 cc. to 200 mg. vial). Shake, allow to stand until clear, remove with sterile syringe and needle and inject.

The freshly prepared solution of Cytoxan may be administered intravenously, intramuscularly, intraperitoneally, intrapleurally, or directly into the tumor. The solution should be administered promptly after being made but is satisfactory for use for three hours after preparation.

If the patient is receiving a parenteral infusion, the Cytoxan solution may be injected into the rubber tubing if the solution is glucose or saline.

No thrombosis or thrombophlebitis has been reported from injections of Cytoxan. Extravasation of the drug into the subcutaneous tissues does not result in local reactions.

PRECAUTIONS: Cytoxan should not be given to any person with a severe leukopenia, thrombocytopenia, or bone marrow infiltrated with malignant cells. It may be given with suitable precautions to patients who have had recent x-ray treatment, recent treatment with a cytotoxic agent, a surgical procedure within 2-3 weeks, or debilitated patients.

AVAILABILITY: Cytoxan is available as follows:

Cytoxan for Injection, 100 mg., a sterile dry-filled vial containing 100 mg. cyclophosphamide and 45 mg. sodium chloride. Packaged, 12 vials per carton.

Cytoxan for Injection, 200 mg., a sterile dry-filled vial containing 200 mg. cyclophosphamide and 90 mg. sodium chloride. Packaged, 12 vials per carton.

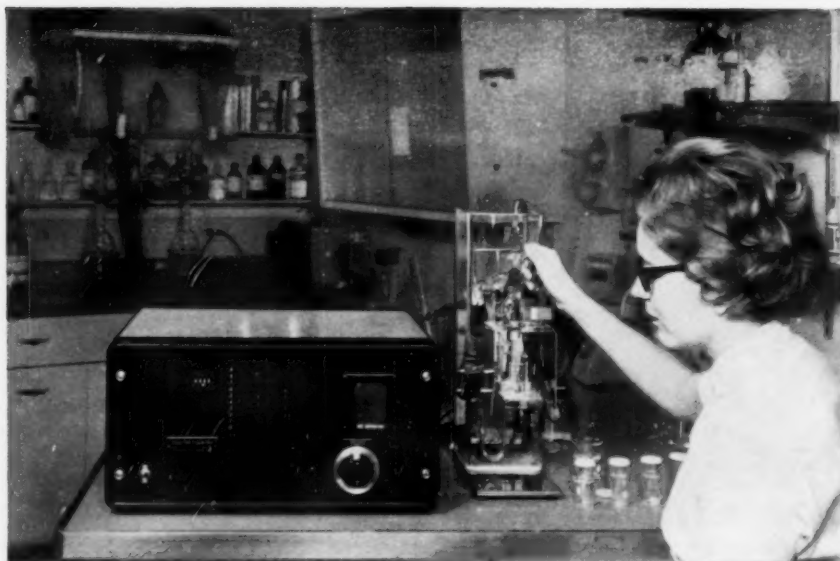
Cytoxan Tablets for oral administration, 50 mg., white, round tablets, flecked with blue for easy identification. Packaged, 100 tablets per bottle.

For a copy of the Cytoxan brochure, or other additional information on Cytoxan, communicate directly with the Medical Department, Mead Johnson Laboratories, Evansville 21, Indiana.



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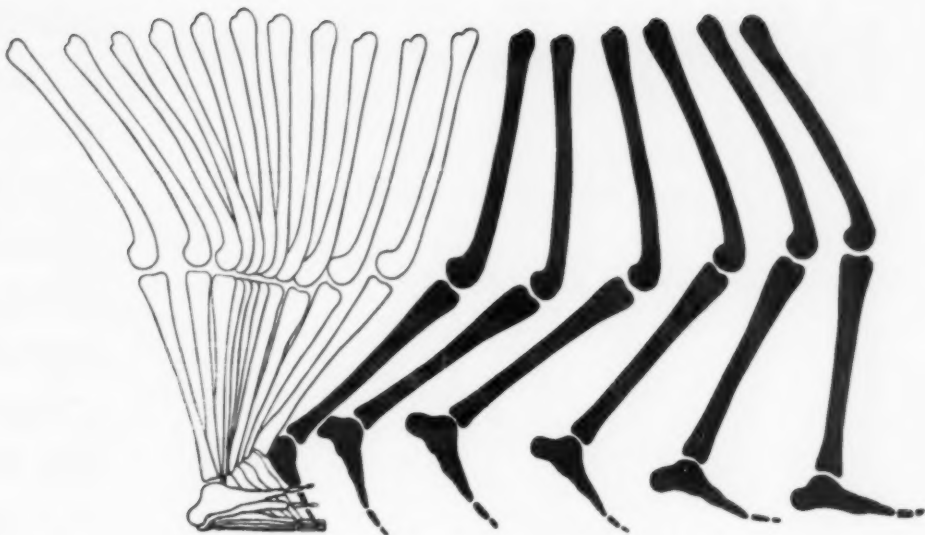
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Intra-articular dosage depends on the size of the joint and the severity of the condition. Injections may be repeated, if necessary, at intervals of one to five weeks. A suggested dosage guide: Large joint, 20 to 80 mg.; medium joint, 10 to 40 mg.; small joint, 4 to 10 mg.

For administration directly into bursae, dosage may be 4 to 30 mg. (repeat injections are usually not needed).

For injection into the tendon sheath, 4 to 30 mg. is a usual range (in recurrent or chronic conditions, repeat injections may be needed).

Precautions

Depo-Medrol for local effect is contraindicated in the presence of acute infectious conditions. Infrequently, atrophic changes in the dermis may form shallow depressions in the skin at the injection site, but these usually disappear in a few months.

Depo-Medrol 40 mg. per cc.

Each cc. contains:

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Myristyl-gamma-picolinium chloride	0.19 mg.
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Medrol (methylprednisolone) acetate	20 mg.
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Sodium chloride	8.9 mg.
Myristyl-gamma-picolinium chloride	0.19 mg.
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1. Norcross, B. M., and Winter, J. A.: Methylprednisolone acetate: a single preparation suitable for both intra-articular and systemic use, New York J. Med. 61:552 (Feb. 15) 1961.

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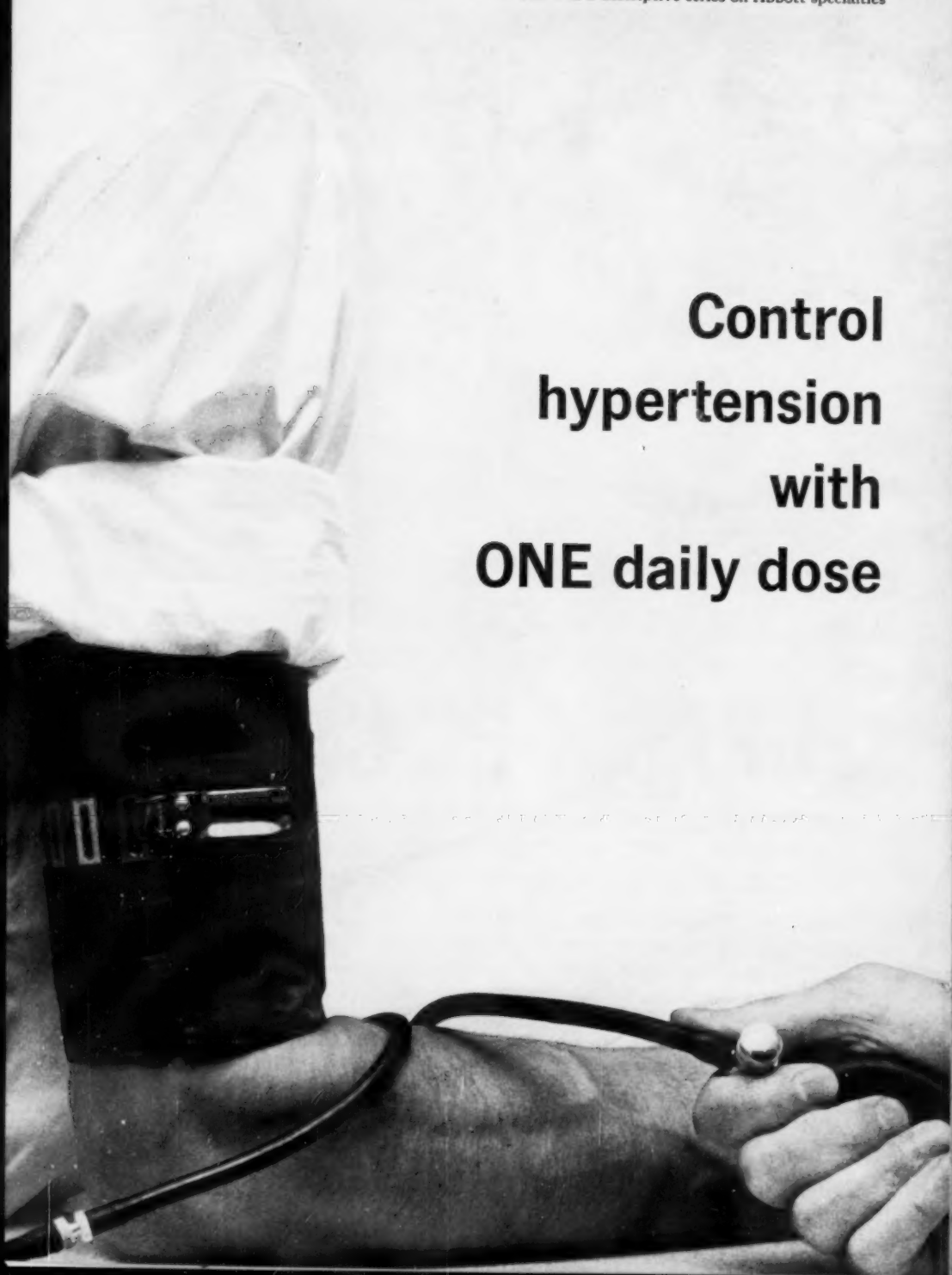
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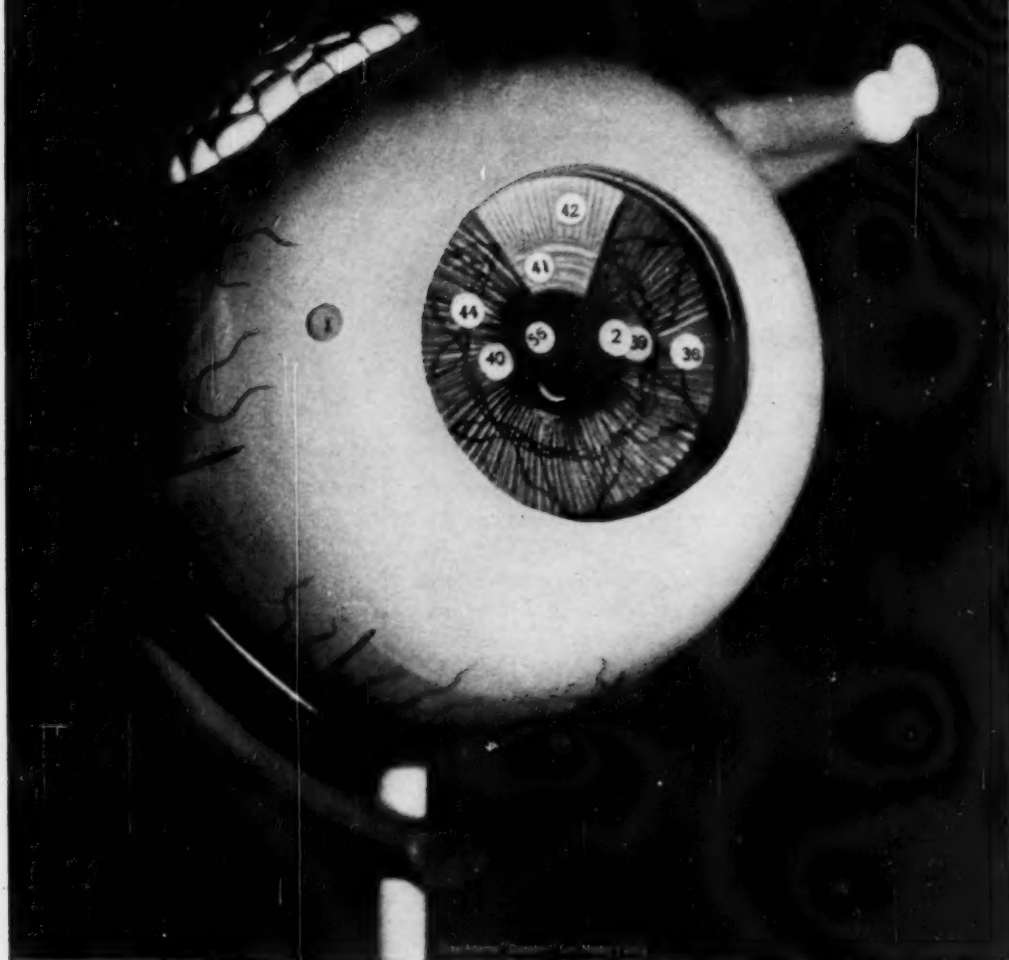
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*Wenckert, A., and Robertson, B.: *Acta chir. scandinav.* 120:79, 1960.



In brief

The dependability of Terramycin is based on its broad range of antimicrobial effectiveness, excellent toleration, and low order of toxicity. As with other broad-spectrum antibiotics, overgrowth of nonsusceptible organisms may develop. If this occurs, discontinue the medication and institute appropriate specific therapy as indicated by susceptibility testing. Glossitis and allergic reactions to Terramycin are rare. The usual precautions required in intravenous administration should be observed. See product brochure for full information. More detailed professional information available on request.

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Dear Doctor:

Reports from our representatives indicate that many physicians would appreciate simplification for prescription-writing purposes of the names of Terramycin products in both the "plain" and the "Cosa" dosage forms.

The "Cosa" forms originated, you may recall, on the basis of clinical evidence of enhanced antibiotic absorption when glucosamine is employed in oral administration. To permit each physician individually to study this evidence and choose which form he would prefer to prescribe, we offered Terramycin in both forms—that is, in the regular Terramycin forms without glucosamine, and in the "Cosa" forms with glucosamine.

This distinction appears to be no longer necessary since glucosamine, a highly acceptable excipient for oral antibiotics, now is being incorporated uniformly in all such forms, thereby simplifying nomenclature and your prescription writing.

Accordingly, and effective immediately, forms incorporating glucosamine will be offered simply as Terramycin without the "Cosa" prefix.

To make clear just which forms are affected, please refer to the brief tabulation (below) of Terramycin dosage forms both *before* and *after* this change. We are also requesting our representative to call on you at an early date to answer any questions that may arise.

We feel certain that this action, prompted by your comments and those of many other physicians, will simplify your writing of prescriptions for Terramycin products.

We welcome your comments on this action and on any other phase of our operations, since it is our objective to render every service as efficiently as possible to our friends in the medical profession.

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The following table indicates the former name and the current name of Terramycin systemic preparations:

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Cosa-Terrabon® Oral Suspension	Terramycin Syrup
Cosa-Terrabon Pediatric Drops	Terramycin Pediatric Drops

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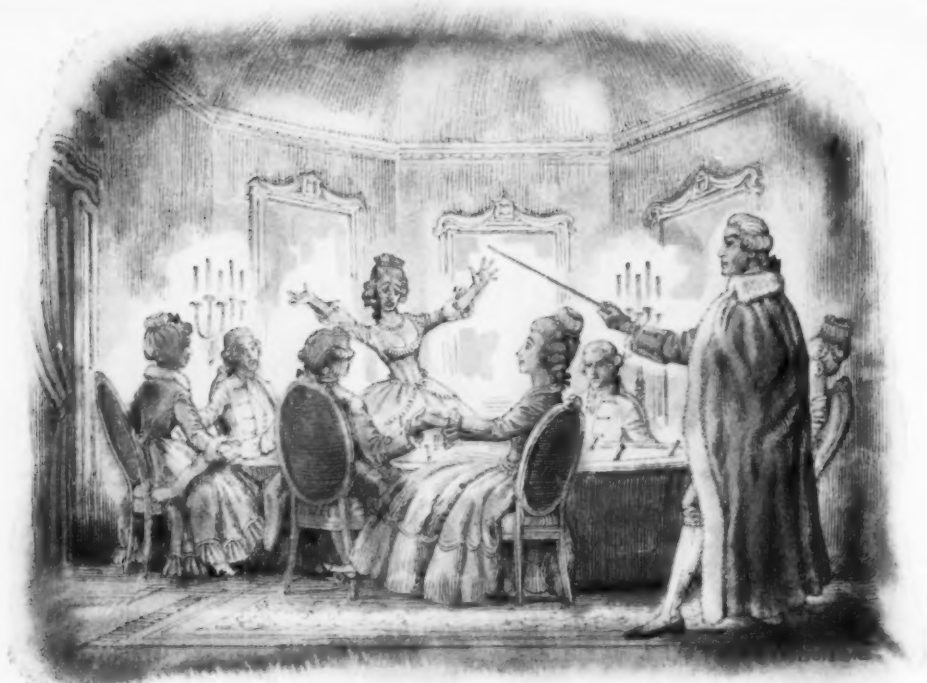
Cosa-Terrastatin® Capsules	Terrastatin® Capsules
Cosa-Terrastatin for Oral Suspension	Terrastatin for Oral Suspension
Cosa-Terracydin® Capsules	Terracydin® Capsules

... and these names remain unchanged:

Terramycin Intramuscular Solution
Terramycin Intravenous

*Terramycin Capsules without glucosamine are no longer available.

The clinical versatility of Terramycin is enhanced by its specialized dosage forms adapted to individual needs—another reason for the trend to Terramycin.



The power of suggestion

Rarely has a method of healing so caught the public imagination as did the therapeutic process of Franz Anton Mesmer in Paris in the 1780's. Mesmer was an accredited physician, a man of science who believed he had discovered a vital new method of curing human ills. He called it *animal magnetism* and theorized that like the drawing power of magnetized iron, certain ailments could be drawn from the body by means of magnetic therapy.

He was utterly sincere in his attempt to prove the existence of this magnetic force, and he gathered many disciples not only from a suggestible Parisian public but from among the honored ranks of the medical profession itself. Lafayette was one of his patients, and avidly told George Washington about it.

Never denying there was an element of theatrics in his approach, Mesmer employed a form of ceremonial group therapy. In his "hospital" in a dimly lit room with thick carpets and carefully placed mirrors to reflect a golden light, sat

the "baquet"—the healing tub. In deep silence the patients formed a "magnetic chain" around the tub, their fingers touching. With strains of music in the background, Mesmer, cloaked in a lilac robe, would walk among the patients waving a "magnetic" wand, sometimes touching a paralyzed arm or a painful back, and soon they would shake and scream, fall prostrate, and one by one shout that they had been cured. Many of them actually were, especially those whose ailments were rooted in nervous disorder.

The French aristocracy of that era virtually formed a mesmeromania, so impressed were they with this mysterious and wonderful healing process. But Mesmer himself was eventually discredited by the professional hierarchy, for neither he nor they could quite realize that it was the healing ability of "the power of suggestion" that had been discovered, rather than any tangible magnetic force.

—STEFAN ZWEIG: *Mental Healers*, New York, The Viking Press, 1932.



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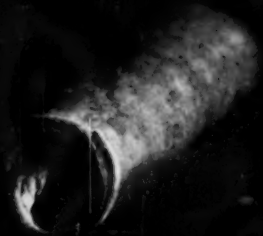
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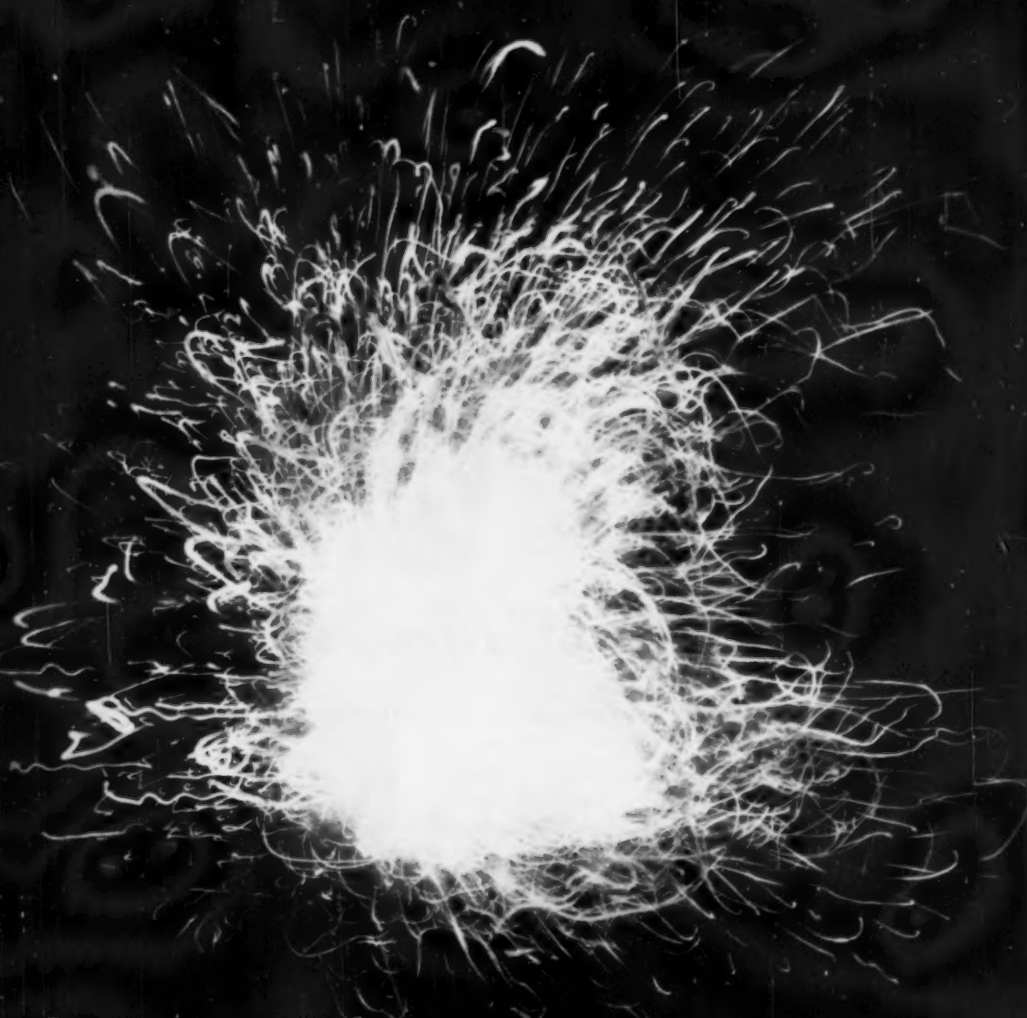
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YEAR BOOK MEDICAL PUBLISHERS, INC.

200 EAST ILLINOIS STREET

CHICAGO 11, ILLINOIS

The Journal of MEDICAL EDUCATION

VOLUME 36 • NUMBER 10 • OCTOBER, 1961

The Threshold of a Revolution in Biological Education*

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INTRODUCTION

The modern world makes increasingly complex demands on its citizens and requires greater adaptability on their part. This adaptability must include an analytical ability of high order and an awareness and an understanding of how knowledge is obtained, for the fact of rapid change in our world is about all we can safely promise our young people. President Julius Stratton, of M.I.T., has put it this way, "The world into which we were born is gone; we have little or no idea of the world into which our children may grow to maturity. It is this rate of change, even more than the change itself, that I see as the dominant fact of our time."

The youngsters attending our primary and secondary schools today will be the leaders of the 21st century. They are beginning their schooling in an age during which our real knowledge seems to be doubling every 10 years, and they can well anticipate an acceleration of this rate of change.

† Director.

* Those interested in further information about the Curriculum Study may write to the Director, BSCS, University of Colorado, Boulder, and ask to have their names placed on the mailing list for the *Newsletter*.

These considerations have important implications for education in the biological sciences. An education based on facts alone is not sufficient. Many of the facts of yesterday are not the facts of today. An education based primarily on concepts and principles is not enough. Not only do our ideas evolve with increasing knowledge, but principles that are taught as "facts"—or as nonsense syllables—have an educational value that is virtually nil. An education based solely on classical case histories is less than sufficient. While a knowledge of evolution, of spontaneous generation, of the germ theory of disease, of the alternations of generations, of ecological succession, is valuable to the student, as a citizen he will face decisions about radiation, fluoridation, conservation policies, population control, medical care for the aged, and other problems unknown to his teachers. An education based only on logical manipulations will not do. To reach intelligent decisions, the student must have or be able to find the appropriate information required as a basis for reasoned conclusions and must know how to use it.

This is not so much a question of preparing tomorrow's scientists but providing the necessary degree of scientific

literacy for all future citizens. Whitehead put it very succinctly 45 years ago by saying: "When one considers in its length and in its breadth the importance of this question of the education of a nation's youth, the broken lives, the defeated hopes, the national failures, which result from the frivolous inertia with which it is treated, it is difficult to restrain within oneself a savage rage. In the conditions of modern life the rule is absolute, the race which does not value trained intelligence is doomed. Not all your heroism, not all your social charm, not all your wit, not all your victories on land or at sea, can move back the finger of fate. Today we maintain ourselves. Tomorrow science will have moved forward yet one more step, and there will be no appeal from the judgment which will then be pronounced on the uneducated."

It is, perhaps, fitting for readers of the *Journal*, to note that the 50th anniversary of the Flexner report finds a very serious—and very promising—revolution occurring in high school science. The present revolution is broader in scope and involves many more people—both at the teaching and learning ends of the spectrum—than that of 1910. Also, it involves a younger age group, and this may well increase the effectiveness of its impact.

There are now several major course content improvement groups, financed by the National Science Foundation, that are focusing on secondary school science and mathematics. The Physical Sciences Study Committee at the Massachusetts Institute of Technology, which began work in 1956, was the first to receive substantial support. Others include the School Mathematics Study Group at Yale University; the Chemical Bond Approach at Reed and Earlham Colleges; the Chemical Education Material Study at Harvey Mudd College and the

University of California; and the Biological Sciences Curriculum Study of the American Institute of Biological Sciences.

Of the national science curricular groups, the Biological Sciences Curriculum Study is in the most critical position in terms of board scientific education for future citizens, since the majority of high school students take biology as their only senior high school science course. A majority of students entering high school do not go on to college. High school biology is, therefore, the last science course taken by most of our students.

Discussions leading to a systematic effort to improve biological education at all levels were initiated in 1955 by the American Institute of Biological Sciences (AIBS), a professional society representing about 85,000 biologists. In January, 1959, the AIBS received a small initial grant from the National Science Foundation to organize the Biological Sciences Curriculum Study (BSCS); this and subsequent grants to date total \$2,000,000. The original grant proposal to the NSF outlined the function of the BSCS with the following words, "to evaluate the content of present biology course offerings, to determine what biological knowledge can and should be learned at each school level, and to recommend how this latter goal can best be achieved." Headquarters for the AIBS Study were established at the University of Colorado in Boulder.

EARLY DECISIONS OF THE BSCS

For a variety of practical reasons, the first focus of the BSCS has been upon the secondary school level. In discussing this first phase of the study, Dr. Bentley Glass of the Johns Hopkins University, who is chairman of the study, has used these words:

"The problem is this: In many high

schools today biology consists primarily of either hygiene or animal biology, presented in terms of invertebrate and vertebrate anatomy. Often, the emphasis is on memorization of long lists of scientific names. And even more often, biology is presented as a crystallized science—one in which all the answers are known.

"As the BSCS works on the high school biology program, we hope that biology—and indeed all science—will be presented as an unending search for meaning, rather than as a body of dogma or as a series of taxonomic exercises. It is not our purpose to establish a standard or definitive body of knowledge. On the contrary, our main objective is to lead each student to conceive of biology as a science, and of the process of science as a reliable method of gaining objective knowledge.

"To a very great extent the key to this understanding lies in meaningful laboratory and field study which incorporates honest investigation of real scientific problems. However, today, what commonly passes for 'lab' is often routine cookbook-type exercises or a mere naming of structures on drawings and answering of questions by looking them up in a textbook.

"The man and woman of tomorrow will live in a scientific world which they must understand and adjust to. In fact, the survival of democracy in this country will probably be dependent on the citizen's ability to foster scientific advancement.

"This will necessitate, first, a respect for an understanding of scientific method; second, an understanding of the very real distinction between pure science and the 'research and development' activities that now receive most of our Federal support to science; and, third, a recognition of the dependence of the latter on the former.

"The aim of the BSCS is to place biological knowledge in its fullest modern perspective. If we are successful, students of the new biology should acquire not only an intellectual and esthetic appreciation for the complexities of living things and their interrelationships in nature, but also for the ways in which new knowledge is gained and tested, old errors eliminated, and an ever closer approximation to truth attained."

According to Dr. John Moore (Chairman of the BSCS Committee on the Content of the Curriculum), of Columbia University, a biology course for the secondary school student should provide him with "an understanding of: his own place in the scheme of nature, namely that he is a living organism and has much in common with all living organisms; the diversity of life and of the interrelations of all creatures; what man presently knows and believes regarding basic biological problems of evolution, development, and inheritance; the biological basis of many of the problems and procedures in medicine, public health, agriculture, and conservation; and examples of the historical development of the concepts of biology to show that these are dependent on the contemporary techniques, technology, and the nature of society." It should also provide him with "an appreciation of the beauty, drama, and tragedy of the living world."

The general policy of the BSCS is determined by a Steering Committee composed of 27 members (nine of whom are replaced annually) currently representing the following categories: professors of biology, high school biology teachers, science supervisors, science educators, medical and agricultural educators, and university and school administrators. The Chairman is Dr. Bentley Glass of Johns Hopkins University. At the present time the largest single group on the

Steering Committee consists of professional biologists, since it is felt that the design of new curricula in biology should depend heavily upon those who have an intensive knowledge of the various facets of the field. Men working on the frontiers of the science have such a knowledge. A greater proportion of in-service secondary school biology teachers has been recruited as the study became more deeply involved in the production and implementation of curricular materials.

An early decision facing the Steering Committee was the grade level for which BSCS materials should be designed. A few schools currently offer a biology course in the ninth grade, but there are serious disadvantages in recommending that this be practiced widely. One reason is that the greater maturity of students in higher grades should afford them a better opportunity to assimilate a conceptual biological course of the BSCS type, especially if some effective instruction in the physical sciences precedes the biology course. Another reason is that the ninth grade, in many school systems, is located in the junior high school. It is often the case that the junior high school teacher is less well prepared in biology than his senior high school colleague, and, with very few exceptions, the laboratory facilities in the junior high school building are even less satisfactory than those in the senior high school building.

A small group of schools has a pattern in which for some students the first course in biology is taken in the eleventh or twelfth grade. At this level, the greater maturity of the students could be advantageous. Perhaps more important is the opportunity (not always grasped) for them to have had courses in both physics and chemistry, prior to biology, so that at least the molecular

aspects of such a biology course could be presented at a higher level.

In most schools (about 80 per cent), the biology course is offered at the tenth grade level. Since the majority of high school students now take only one science course, most students would not take biology if a different science were standard for the tenth grade.

Thus, the question before the BSCS resolved itself into whether it was better to design a general education course in biology for the large majority of high school students or whether it was better to design a more sophisticated course for a small number of select students.

The decision of the Steering Committee was to give priority to the preparation of materials for a first course in biology for the tenth grade level where there is a potential of reaching 1,750,000 students annually. (A second course, for eleventh and twelfth grades, would be considered later.)

Since a majority of these tenth grade students do not go on to college, the tenth grade biology course is the last change in the classroom to prepare such students (who will comprise over one-half of our adult population) for the rapid changes in scientific knowledge and concepts they will face during their lifetimes—to teach them how to handle and evaluate new scientific knowledge as it becomes available. At best this is a difficult task; but the difficulty is compounded by the fact that a realistic general biology program, suitable for wide use in American schools today, must take into account a wider range of student ability, interest, and potential than is present in other high school science courses. It must be a course that most tenth grade students can handle and, at the same time, prove challenging to the above-average student. These are some of the factors that were considered as

the BSCS began preparation of new materials for a first general biology course.

This position led to a second important decision reached by the Steering Committee. Philosophically, the Committee felt it undesirable for the BSCS to design a single approach to the study of biology for tenth grade students. This decision was unrelated to the question of a national curriculum in the coercive sense, since, eventually, BSCS materials will be on the open market to be utilized, modified, or discarded by the schools in open and free competition with other existing materials. Even so, it was considered desirable to introduce the greatest possible flexibility in the BSCS materials themselves, since biology is a diffuse field (as contrasted with the relative linearity of mathematics, chemistry, and physics) and a variety of good and interesting approaches is possible. It was felt, also, that the special background of the teacher and his local situation could be more advantageously used if multiple approaches were available.

THE THREE VERSIONS OF BSCS HIGH SCHOOL BIOLOGY

One of the early suggestions was that the BSCS prepare a series of fresh and modern pamphlets on a wide array of biological topics so that the teacher could, by judicious selection, design his own course with them. The practicalities of the actual classroom situation in America, however, negate the pamphlet series as a primary method of producing usable school materials. The facts are that most teachers have to meet five or more classes a day for 5 days a week, in addition to the extra curricular assignments, and the grading of the papers of upwards of 150 students, many of whom are not specifically interested in their studies. Also, there is a large num-

ber of high school biology teachers with deficient training in the field, who have come into their positions through an indirect pathway (home economics, physical education) or by default. (Principal to newly appointed Social Studies teacher: "Our enrollment in biology is larger this year than anticipated so I'd like you to teach two classes of biology.") These considerations led to the decision that most teachers, because of conditions beyond their control, require some kind of a "package" presentation and could not make effective use of a pamphlet series as the basis for building their courses.

The net result of such discussion was the decision to prepare three different versions of a first course in biology for typical students in American secondary schools.

To accomplish this a Writing Conference was held at the University of Colorado during the summer of 1960. Here 69 writers—high school biology teachers and collegiate research biologists—prepared materials for three preliminary experimental versions of new basic courses. Each of these would utilize a different approach. The teams prepared texts, laboratory manuals, teacher's commentaries and guides, and brief techniques films.

The Blue Version (supervisor: Dr. Ingrith Deyrup, Barnard College) develops the fundamental biological concepts with stress on the ideas and experimental approach of physiology and biochemistry. It begins with the basis of life in the properties and organization of matter. It then moves to the activities of these organizations as seen in the capture and use of energy, then to the organ level, and finally to the level of the whole organism and of populations. Genetics is couched in terms of the conservation and modification of molecular organization from generation to generation; evolution is the basis for

long-term changes in the development of diversity among living organisms. The treatment of certain open-ended biological problems which face man as a citizen of a socially organized community concludes the text presentation.

The Yellow Version (supervisor: Dr. John Moore, Columbia University) begins with the whole organism, and man as exemplar of the animal, from a functional point of view. The traditional major functions are treated system by system, rarely going below the organ level. Next is a similar treatment for the green plant, with more detail and a variety of examples. Concepts of evolution and adaptation are emphasized in the various examples. Then the student is confronted with the fundamental chemistry and dynamics of the living cell, including the detail of chemical action necessary to a genuine understanding of "being alive" and involving DNA, RNA, and ATP. The remaining chapters concern microbiology, diversity in the plant and animal kingdoms, genetics, reproduction and development, and evolution.

The Green Version (supervisor: Dr. Marston Bates, University of Michigan) takes the individual organism as the primary unit of study. It is concerned with how individuals are organized into populations, species, and communities, and with what organisms do and how they do it. It starts with cycles of energy and materials in the biosphere, then turns to such structural units as individuals, populations, and communities. Following the taxonomic diversity of animals, plants, and micro-organisms, it deals with ecological diversity on land, in fresh water, in the seas; with geographical diversity among the continents and oceans; and then with the history of life and the problem of evolution. The student studies the cellular structures of organisms; genetics; the physiology and development of plants and animals;

animal behavior; the relations of the parts to the functioning of the whole organism; and the human animal in the perspective of his biological setting.

All three of these new programs share several common aims: to make clear to the student the nature of scientific inquiry, the intellectual history of biological concepts, genetic continuity, homeostasis, complementarity of structure and function, diversity, and other similar important concepts. In addition, each program is infused with such ideas as the quantitative approach, incertitude, aesthetics, limits of knowledge, speculation, temporal parameters, dynamic systems, and multiple variables.

In all three of the versions, the laboratory takes a more important place than is found in most current biology courses, and the emphasis is quite different. In these versions, the laboratory program (which was under the supervision of Dr. Glass) reflects both the investigatory as well as the illustrative function of laboratory work. The students not only examine materials, but they conduct experiments and investigate real open-ended problems.

TESTING OF THE NEW MATERIALS

The three versions of the BSCS high school biology courses were tested in a systematic program during the 1960-61 school year. To accomplish this, a series of fifteen Testing Centers had been organized throughout the country. Each Testing Center consisted of six to nine biology teachers, within a commuting area, who were using the new material with their classes. One of these teachers was designated Center Leader and was responsible for Center management. Each Center was assigned a university research biologist as a Consultant to advise on biological content of the program. In addition, one biology teach-

er in each of thirteen Independent Test Schools used the new materials.

All Test Center Leaders and Consultants and all teachers involved in the Independent Test Schools were participants in the BSCS Summer Writing Conference. In addition, all the teachers and Consultants participating in the BSCS Testing Program attended a 6-day Briefing Session in Boulder, Colorado, before school opened to discuss the purposes of the new materials and to prepare for using them in their classes. Thus, a total of 118 teachers, with their 14,000 pupils, used the new materials in a wide variety of classroom situations during the 1960-61 school year. The participating schools included private and public, parochial and non-sectarian, urban and rural, large and small, and senior and junior high schools.

Systematic feedback on the experiences of the participating teachers with these new BSCS experimental materials was obtained throughout the year in several ways:

1. Each Testing Center conducted a weekly 3-hour meeting at which the teachers discussed their experiences with BSCS materials during the previous week and their plans for the coming week's work. Reports on these meetings were sent regularly to the BSCS headquarters office.

2. BSCS staff members visited each participating school during the school year to discuss the program with principals, supervisors, teachers, and students.

3. In cooperation with the Educational Testing Service, several objective tests were given throughout the year to all students using the new materials to determine the extent to which students were learning the information and ideas that the writers consider important.

A second Writing Conference followed in Boulder during the summer of 1961

where the experimental materials were completely rewritten, based upon the feedback that had been obtained. The BSCS is now organizing a more comprehensive evaluation program, involving about 350 teachers and 36,000 students, for the 1961-62 school year. In the summer of 1962 a Third Writing Conference will rewrite the materials to produce a final series of manuscripts. These materials—which by then will have been tested in real classroom situations with about 50,000 students and 400 teachers and will have undergone two major revisions by large and representative teams of outstanding research biologists and secondary school biology teachers—will then be available as model courses. It is hoped that there will be widespread adoption of these courses designed by the BSCS. It is also hoped that independent authors will use our materials as a point of departure to design their own courses and that such courses will also have extensive use.

A tremendous amount of work has already gone into the design of secondary school biology curricula at state and local levels. Much of it is good, sound and solid. What is the justification, then, for this new effort by the BSCS, and what advantages over existing biology curricula might accrue from the study? If there is a single important way in which the BSCS differs in its approach from these many independent studies made over the years by high school faculty members and state and urban education department staffs, it is that the BSCS involves the active participation of a large number of professional biologists who know the life sciences intimately through first-hand investigations. These biologists bring to the new biology curricula an extensive store of modern knowledge, overview, and perspective that is available nowhere else in our society. The unique aspect of the

BSCS is that it brings to a cooperative team the special competencies of the biological scholars in our universities and the teachers in our high schools.

The present generation of scientists is beginning to cooperate extensively with teachers and educators in a way that had been customary in the 1800's. There is an unprecedented activity developing today on college and university campuses where scientists are helping to design new courses and bring recent advances into the classroom. Examples include NSF summer and academic year institute programs and the teacher education and professional standards meetings. Biologists are participating fully in such activities. However, although extremely valuable, summer and academic year institutes cannot by themselves introduce large-scale coordinated curricular revision.

School administrators should begin to inquire whether the new programs are suitable and whether the recommended curricula are superior to those now being offered in our high schools. Only after affirmative judgments are reached would it be timely to become concerned with details of implementation on a local level.

We confidently anticipate that students and teachers who participate in BSCS courses will experience the excitement and thrill of the scientific revolution that is reshaping our modern society. Besides enjoying the satisfaction that comes with acquiring solid knowledge in the life sciences, we hope that students will be able to distinguish between science and superstition and, as citizens, that they will be prepared to deal intelligently with the thousands of problems in which scientific attitudes are appropriate.

THE LABORATORY BLOCKS

Even in schools where good biological

laboratory facilities exist, their tremendous educational potential is not always realized. Too often laboratory exercises are sterile routine affairs giving little insight into the ways in which scientists think and work, the processes by which knowledge is uncovered, and the reasons for precise measurements and controlled experiments. Our laboratory program is attempting to rectify this situation. In addition, the BSCS Committee on Laboratory Innovations, under the chairmanship of Dr. Addison E. Lee, of the University of Texas, is designing a new kind of laboratory experience—a block approach—to supplement the BSCS general biology course materials. These blocks comprise an enrichment program designed to reach beyond the extensive laboratory experiences already built into the three versions.

In practice, a teacher would select one block, from among several available, for use during a particular school year. Each laboratory block requires 6 weeks of intensive work. For these 6 weeks, all class activities—whether discussion, laboratory work, reading, or field work—center on a single area of biology. The students progress from simple to more sophisticated experiments and gain an experience in depth in the problem area. Because of the time that will be spent working on a single problem area, and the increasing complexity of the experiments, it is hoped that the student will be able to derive a sense of the processes of science and the nature of scientific inquiry and discovery, and that he will learn why science requires precise measurements, accurate observations, and conciseness and clarity in communication. He should obtain an understanding of teamwork in the laboratory, the importance of experimental controls, and how hypotheses are developed and tested. He should come to rec-

ognize good investigatory procedures and be better prepared to bring a scientific attitude to those problems he will face as an adult that are susceptible to such analyses. The seven laboratory blocks now completed are: *Plant Growth and Development*; *Microbes, Their Growth, Nutrition and Interaction*; *Animal Growth and Development*; *Interdependence of Structure and Function*; *Regulation in Plants by Hormones*; *Animal Behavior*; and *The Ecology of Land Animals and Plants*.

These blocks were tested during the 1960-61 school year. Eight of the BSCS Testing Centers and four of the Independent Test Schools each utilized one block in conjunction with their BSCS courses. It is planned to design about five more blocks in the immediate future. During the 1961-62 school year, four schools will be experimenting with a second level high school course based upon a series of blocks. In addition to their intrinsic value, the blocks provide for increased flexibility in the BSCS program for secondary school biology.

THE GIFTED STUDENT

Although the major efforts of the BSCS have been directed toward a new general biology program suitable for virtually all high school students, the special needs of the student talented in science have not been neglected. The Committee on the Gifted Student—under the Chairmanship of Dr. Paul Brandwein of Harcourt, Brace, and World—has been exploring the needs of teachers in their work with the science-prone student and has prepared an experimental volume which is designed to meet some of these needs. *Biological Investigations for Secondary School Students* is intended to be shared by teacher and student and includes 100 research prospectuses suitable for out-

of-class investigations by the more able science student. The volume begins with a discussion intended to orient the student in the selection and use of a research prospectus. To obtain these prospectuses, the Gifted Student Committee invited biologists throughout the country to contribute suitable research projects for which the results are currently not available in the literature. Of more than 500 prospectuses contributed, 100 were selected and edited for inclusion in this first experimental volume. This book is being made available to teachers in the BSCS Testing Program and to other interested persons, for use on an experimental basis before additional volumes of prospectuses are prepared.

TEACHER PREPARATION

Of prime importance in any teaching activity is the teacher. A highly qualified and representative group has been recruited to serve as a Committee on Teacher Preparation. Dr. Joseph J. Schwab, University of Chicago, is its chairman.

The members of this Committee are well aware that the high school teacher, who needs to be a generalist and an interpreter of science, is usually taught biology by men who are specialists and investigators. It is obviously important that the high school teacher understand the ways in which biologists accumulate the knowledge of their science. Teachers should be appreciative and informed concerning the nature of the scientific enterprise. Unfortunately, this experience is typically gained only at the post-graduate level in a research program. Provision is not normally made for such training at lower levels of instruction. Until recently, few specific recommendations for alleviating this condition have been made. Most suggestions for teacher training in biology have been

based on surveys of existing practices with the result that there are few real innovations in teacher education. Some courses that satisfy certification requirements are too frequently of little benefit to pre- or in-service teachers, and often desirable courses are not recommended. Example: although courses for teachers on the history and philosophy of science would appear to be potentially valuable in improving the climate of high school science courses, they are not required for certification in any state.

Much of the criticism levied against the teaching of science today is related to the difficulty of encompassing the entire range of subject matter included in the field of biology. Redesign of existing in-service and pre-service courses is certainly part of the answer. Perhaps even more important, however, scientists must learn how to communicate their findings to teachers in understandable language and to make their ideas available through less technical publications than are now available. To help satisfy this need the BSCS is planning the production of an extensive pamphlet series. We hope to prepare a series of pamphlets, on a periodic basis, that collectively will comprise a specific reference library for secondary school teachers of biology.

The pamphlet series will probably consist of 32-page pamphlets issued monthly during the school year. Each is to be written by a specialist in an area of his interest and meaningfully illustrated. Where necessary, the manuscripts will be rewritten by competent science writers so that the finished pamphlets will be interesting and informative to an average high school teacher as well as scientifically accurate and up-to-date. Early topics under preparation include animal orientation, biological clocks, and oceanography. It is hoped that the series will be comprehensive

enough to form a background library for those teachers with incomplete training and will be representative enough to provide for an updating of all teachers. In addition to use by teachers for their own self-improvement, the series might provide a few especially competent and ambitious teachers the opportunity to design their own courses based on this periodical material. The series should also be useful as collateral reading for college and medical students.

As one phase of the Teacher Preparation program, during the summer of 1960, the BSCS produced three short biological techniques films. The aim of this series is to present, in compact visual form, practical information about modern biological techniques with which many teachers have not had first-hand experience. The three films so far produced deal with techniques in bacteriology, *Drosophila* genetics, and removal of frog pituitary. These three succinct 16-mm. sound and color films total 10 minutes of running time. Preparation of additional films is underway.

In preparation for the secondary school projects of the BSCS, Dr. Paul DeH. Hurd of Stanford University made an exhaustive historical study of high school biological education in the United States. His study examines the recommendations of national committees appointed since 1890 that have considered the problem of science education with special reference to the secondary schools. It also reviews research studies in science education, analyzes books on the teaching of biology, and summarizes the problems, issues and trends in the teaching of secondary school biology. Dr. Hurd's report is now available as the first number of the *BSCS Bulletin* series.

INTERNATIONAL COOPERATION

Educators from outside the United States have shown great interest in

BSCS activities. Inquiries concerning use of BSCS materials have been received from 41 foreign countries. Overseas visitors at the BSCS office in Boulder have included scientists and educators from India, Ceylon, Great Britain, Switzerland, Holland, and Nigeria. Because of this widespread interest by foreign educators, a Committee on International Cooperation—with Dr. James G. Dickson of the University of Wisconsin as Chairman—was established in 1960.

At the Seventh National Conference of the U.S. National Commission for UNESCO in Denver, September 29–October 2, 1959, the possibility of coordinating efforts of biologists of the Americas in improving biological education was discussed at some length. The Latin American biologists present expressed interest in cooperating with the BSCS in the preparation of general biology courses for use in Latin America. Following this, the Rockefeller Foundation made a grant of \$1,898 to the AIBS to support the expenses of two biologists—Dr. Humberto Gómez of the Universidad del Valle, Cali, Colombia, and Dr. José Herrera, Universidad de Chile, Santiago, Chile—to meet with the BSCS Steering Committee at a planning session in New Orleans in January, 1960.

Although the BSCS was established to produce course materials for use in the United States, the Study would be pleased to have the results of its work used elsewhere in the advancement of biological education. However, the *BSCS High School Biology* was designed for students in the United States; before use in any other country, the materials should be specifically adapted for that country by its resident biologists and educators. Climatic, ecological, and other differences must be taken into account. For example, discussions of familiar plants of commercial importance

in the United States might cite corn and wheat, while in India the examples would more properly be rice and millet. Also, many plants and animals referred to in the present materials as examples of diversity are not familiar to residents outside the North Temperate Zone of the Western Hemisphere. Among the other topics that obviously need modification in overseas versions of BSCS materials are: conservation, agriculture, sanitation, medicine, hygiene and other applications of biological knowledge.

The BSCS began to cooperate with representative foreign teams during the summer of 1961 in making such adaptations. Teams of biologists from Argentina, Brazil, Colombia, Nigeria and Thailand worked with the BSCS in Boulder in adapting the materials for use in their own countries. This pilot international program was supported jointly by The Rockefeller Foundation and The National Science Foundation.

FUTURE PROGRAMS AND PROBLEMS

Among the future programs for the improvement of biological education currently planned by the BSCS are recommendations for a second course in high school biology and a cooperative arrangement with other scientists in a study of elementary and junior high school science. A college committee has been established with Dr. Herman Speith, Chancellor of the Riverside Campus of the University of California, as chairman. It has just completed a feasibility study on introductory college biology courses and the matter is now under review by the AIBS.

Perhaps a word should be said about some of the broad implications of the present program. Many high school teachers are now giving good courses in biology. There is no reason why they should feel any pressures for change,

real or imagined, when final recommendations are made by the BSCS. There is at the present time perhaps too much of a trend to change simply for the sake of change itself without a full evaluation of the programs concerned. The BSCS materials will be on the open market and can be utilized or not as seems best locally. There is no desire on the part of the AIBS or the BSCS to promote a national curriculum. It is hoped that the biology courses that are finally developed by the BSCS will be adopted completely on their merits. The eventual success of the program does seem assured because of the quality of the members of the working committees and the rare enthusiasm with which they are working.

The solution of important problems in science education will require the attention of many experts and scholars both from within and without the BSCS. Major changes in science education will depend upon the cooperative activities of the various curriculum studies, both current and planned, as well as upon teachers, educators, parents, scientists, and administrators. Small groups, such as the BSCS, can wield great influence and can sometimes trigger widespread demands for reform. However, the implementation of details for a new school curriculum, for improved professional preparation of teachers, and for the development of community support for the physical improvement of schools, requires an uncommon degree of mutual understanding and cooperation by diverse groups interested in better science education.

There are a number of important problems which must be, but have not yet been, investigated by the BSCS. Two of these are (a) the proper interrelations of biology with the other succeeding or preceding science courses given at the intermediate and secondary school

levels and (b) grade level placement and development of biological concepts from kindergarten through grade 12. Related questions that must be considered by the various BSCS committees and other interested persons are: How can scientists representing all fields of biology best contribute to the development of an improved elementary school program in science? Is the current general pattern of a year of biology, chemistry, and physics in the senior high school satisfactory? Should there be a year of life sciences in junior high school?

The efficiency of education, in terms of human learning, is an extremely important area in a rapidly advancing technological society. There is a fair amount of dependable information available on education that has not been widely utilized by those involved with instruction. Much of this information relates to the psychology of human learning and is of potential importance in curricular design. However, much additional research of an investigative nature must be brought to bear on many educational problems. One of the more important of these is the nature of human learning. Psychologists concerned with this field should be encouraged to conduct appropriate research structured so that their conclusions can be advantageously incorporated in the development of new courses of study. Cooperative activities among these investigators and the various curricular studies is highly desirable. Some efforts along these lines are being initiated at the present time.

Much work needs to be done in the area of educational media, because these are the vehicles of instruction. It is interesting that reliance on traditional and unproved educational methodology is slowly being broken down. In cooperation with other specialists, biologists must try to determine how lasting are

behavioral changes in student attitudes when different media are exploited in biological science education. How effective are such changes, if any? The present trend to automation through such devices as TV, films, and teaching machines will certainly cause us to look more closely at the total role of the individual instructor in the biology classroom.

We need to know more about the educational values of departmentalized successive courses (biology, chemistry, physics) versus an integrated science sequence of similar time duration. We need to probe deeper for better methods of preparing teachers, and the BSCS is conducting a modest inquiry along these lines. We need to translate into daily practice such difficult but promising ideas referred to by educators as readiness, motivation, whole child, and others.

In the education column of *The New York Times*, Fred Hechinger had this to say of the Biological Sciences Curriculum Study: "Aside from its significance for the teaching of biology, the study highlights a new trend of school reform in America; it removes the barriers of isolationism among different levels, and, perhaps more important,

among teachers, professors, and researchers. At the same time it aims at planning the curriculum, not as a series of 1-year blocks but as a body of knowledge. And it looks on the student's progress, not as a process of registration in separate courses but as a mountain path toward greater understanding for all and toward a summit for some."

The next half-dozen years should be exciting ones in American higher education. During this period medical schools should begin to receive a trickle of students who, during high school, were exposed to the new mathematics, the new chemistry, the new physics, and the new biology, and who were fortunate enough to attend colleges ready to receive them. These new programs may well contribute to an expansion of the reservoir of research-minded scientists. More important, perhaps, among people generally they may improve the understanding of the function of basic research in our modern society. It is probably not too extravagant to anticipate that the medical care of our people will be directly benefited by the impact of these new programs both on our future physicians and the general public they serve.

Graduate Education in Pharmacology*

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The Committee on Educational Affairs of The American Society for Pharmacology and Experimental Therapeutics has devoted a major part of its efforts to problems of recruitment of future pharmacologists, the status of graduate training in pharmacology, and the relationship between the "supply" of trained pharmacologists and the "demand" for them. The authors (acting for the Committee) have carried out questionnaire surveys of the state of graduate education in pharmacology for two consecutive 5-year periods, 1950-1955 and 1955-1960. The basis of this report is a statistical summary of the completed questionnaires, with particular emphasis upon the data in the more recent of the two questionnaires.

MATERIALS AND METHODS

In 1954-1955 a questionnaire was sent to the heads of the departments of pharmacology in schools of medicine, pharmacy, and dentistry in the United States; in 1959-1960 a similar questionnaire was sent to the heads of departments of pharmacology of 96 schools of medicine, and to the deans of the 76 schools of pharmacy, the 46 schools of dentistry, and the twenty schools of veterinary medicine in the United States and Canada. (Inadvertently, a questionnaire was not sent to the University of Puerto Rico.) The questionnaires were

* Supported in part by a grant (2G-391) from the National Institute of Health.

designed to obtain numerical answers to specific questions; some questions requested information for the 5 academic years preceding the year of the survey. In our experience, such specific and accurate information can be obtained only from the records of the individual departments concerned.

Data from the questionnaires were summarized by standard statistical methods. For the second questionnaire, data were sorted and tabulated mechanically after being recorded on punched cards.

More systematically in the second than in the first questionnaire, there was incorporated a series of "check points": pairs of numbers (some as they were asked for, some the sums of individual values requested) which in theory should be identical. After complete analysis of all the data, the 28 check points were segregated from the rest of the pooled data, and the difference between the values of each pair was expressed as a per cent of the smaller.¹ The mean per cent difference was 5.6 per cent, the median 2.7 per cent, the range 0.2-25.6 per cent. Five of the per cent differences

¹ The computation of the per cent difference for a "check point" is illustrated in this example: In Table 2, in the column headed "1959-60," the total academic staff in all departments was 626 (line 1). In the same column, the sum of numbers of full and part time staff (lines 7, 8, and 9) totaled 655, 29 more than 626. The difference is 4.7 per cent of 626.

were greater than 10 per cent; twenty were less than 5 per cent. The greatest per cent differences were associated with questions requiring "follow-up" data on former students and staff members after intervals as long as 5 years. We believe the data reported are both accurate and reliable. Data on present conditions are probably accurate to within 5 per cent of their reported values; virtually all the data are accurate to within 10 per cent of their reported values.

Data from twelve schools of medicine in Canada did not differ significantly from data from schools in the United States, except in those questions concerned with citizenship status of staff members and trainees, and the countries in which staff members received training. Unless otherwise indicated, the data reported are pooled data for schools in Canada and the United States.

RESULTS

In 1954-1955, 89 per cent of the 81 medical school departments of pharmacology in the United States completed and returned questionnaires. In 1959-1960, 100 per cent of the schools of medicine surveyed, 91 per cent of the schools of pharmacy, 95 per cent of the schools of veterinary science, and 89 per cent of the schools of dentistry responded to the questionnaire. Obviously, without the excellent and gratifying cooperation of the respondents, this report would have been impossible.

Institutions offering graduate training in pharmacology.—The number of medical school departments of pharmacology which give advanced training in pharmacology was greater than the combined number of departments in schools of pharmacy, veterinary science, and dentistry which give similar programs. During the past 5 years, and during the present academic year, the number of degree candidates in medical school de-

partments of pharmacology exceeded the number in any of the other three kinds of professional schools, and almost certainly exceeded the combined total in schools of pharmacy, veterinary science, and dentistry. In 1959-1960, 87 of 96 medical schools offered advanced training leading to an M.S. degree, a Ph.D. degree, or both (Table 1).

Because of the relatively greater contribution of schools of medicine to graduate training in pharmacology the bulk of this present summary is concerned with the status of graduate education in pharmacology in schools of medicine. Hence, it might be useful to characterize briefly the population studied by means of the questionnaire of 1959-1960. All 96 department heads to whom the questionnaire was sent returned the completed questionnaire to the Committee. Eighty-one headed separate departments of pharmacology. In fifteen schools the department of pharmacology was combined with another department such as physiology or biochemistry. Ninety-two of the departments were responsible for undergraduate teaching of pharmacology in 4-year medical schools; four, in 2-year medical schools. Sixteen of the departments were responsible, also, for undergraduate teaching of pharmacology to students of pharmacy; 28 were responsible for undergraduate teaching of dentistry, as well as students of medicine. Forty-five of the schools were state-supported, 35 privately endowed, and sixteen were supported either by other sources or by both private and state funds. For 91 departments there was a graduate school associated with the university or college of which the department was a part. Eighty-seven departments did give advanced training; six gave training leading only to an M.S. degree; eleven gave training leading only to a Ph.D. degree.

TABLE 1
GRADUATE EDUCATION IN PHARMACOLOGY

In schools of medicine, pharmacy, veterinary science, and dentistry in the United States and Canada.

Unless otherwise stated, the data refer to 1959-1960.

Category	Medicine	Pharmacy	Vet. Science	Dentistry
Number of respondents				
Number of schools surveyed	96/96	69/76	19/20	41/46
Schools associated with a graduate school*	95%	72%	95%	35%
Departments giving a program leading to an advanced degree*	91%	48%	58%	7%
Number of departments giving a program leading to an advanced degree	87	33	11	2
Departments giving a program leading to a Ph.D. degree*	84%	25%	32%	3%
Number of departments giving a program leading to a Ph.D. degree	81	17	6	1
Total candidates for M.S. degree (1955-1960)	366	218	22	2
Total candidates for Ph.D. degree (1955-1960)	534	103	15	0
Candidates for M.S. degree (1959-1960)	120	52	9	2
Candidates for Ph.D. degree (1959-1960)	221	20	9	0
Number of staff members who are members of American Society for Pharmacology (1959-1960)	312	12	4	4

* As per cent of the number of schools responding to the questionnaire.

In 70 departments, training was given leading to both M.S. and Ph.D. degrees.

Academic staff.—The total number of academic staff in pharmacology (rank of instructor or higher) in all the medical schools in 1959-60 reached 626; the number of new staff positions has increased at an average rate of 53 per year since 1955-1956. This increment includes the staff members of newly formed departments as well as increases in the number of staff members in existing departments. The proportion of persons participating in graduate education has also increased progressively. During the past 6 academic years, the relative proportion of full- and part-time teachers has remained constant, and the ratio of members of the Society of Pharmacology and Experimental Therapeutics to total staff has remained constant at about 50 per cent. There is evidence that

the proportion of total teachers with only Ph.D. degrees has increased from 42 per cent to 54 per cent during the past 6 years, whereas the proportion of teachers with M.D. degrees (or D.V.M., or D.D.S. degrees) with or without a Ph.D. degree has decreased from 51 per cent to 44 per cent (Table 2). It should be pointed out, however, that during the 5-year period covered by the last survey, with a larger number of respondents than the first survey, there is no clear trend in the proportion of staff members with Ph.D. degrees only.

Sixty-five per cent of full-time staff members of medical school departments of pharmacology in the United States received the major part of their pharmacological training in a medical school in the United States; 19 per cent received their major training outside of the United States (Table 3).

TABLE 2

TOTAL ACADEMIC STAFF IN 98 MEDICAL SCHOOL DEPARTMENTS OF PHARMACOLOGY

Totals for each category are also expressed as a per cent of total staff members for each year.

Data for 1954-1955 are based on only 72 respondents.

	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Total number of academic staff in pharmacology (rank of instructor or higher)	336	417	461	521	594	626
Total number participating in graduate education	223 (66%)	279 (67%)	314 (68%)	354 (68%)	415 (70%)	456 (73%)
Total number with only Master's or Bachelor's degree	33 (10%)	11 (3%)	12 (3%)	14 (3%)	14 (2%)	15 (2%)
Total number with Ph.D. degree, but without M.D., D.V.M., or D.D.S.	142 (42%)	210 (51%)	248 (54%)	278 (53%)	317 (53%)	340 (54%)
Total number with M.D., D.V.M., or D.D.S., but without Ph.D. degree	122 (36%)	132 (32%)	136 (30%)	160 (31%)	181 (31%)	191 (31%)
Total number with Ph.D. degree and M.D., D.V.M., or D.D.S.	49 (15%)	63 (15%)	66 (14%)	76 (15%)	85 (14%)	87 (14%)
Total number with full-time faculty status	273 (81%)	351 (84%)	391 (85%)	447 (86%)	491 (83%)	517 (83%)
Total number with part-time status ($\frac{1}{2}$ time or more)	23 (7%)	22 (5%)	24 (5%)	25 (5%)	29 (5%)	29 (5%)
Total number with part-time status (less than $\frac{1}{2}$ time)	59 (18%)	55 (13%)	57 (12%)	67 (13%)	93 (16%)	109 (17%)
Total number who are members of the American Society for Pharmacology and Experimental Therapeutics	164 (49%)	198 (48%)	215 (47%)	257 (49%)	302 (51%)	312 (50%)
Total number who are members of a Society of the Federation, other than the Pharmacology Society	59 (18%)	75 (18%)	83 (18%)	98 (19%)	109 (18%)	115 (18%)

TABLE 3

SOURCE OF TRAINING OF FULL-TIME STAFF MEMBERS IN THE 84 UNITED STATES
MEDICAL SCHOOL DEPARTMENTS OF PHARMACOLOGY IN 1959-1960

	Number	Number as per cent of total
Obtained major part of pharmacological training in a medical school in the United States	388	64.5
Obtained major part of pharmacological training in the United States, but not in a medical school	102	16.9
Obtained major part of pharmacological training outside of the United States	112	18.6

TABLE 4

TOTAL FULL-TIME POSITIONS, FINANCIAL SUPPORT OF FULL-TIME STAFF MEMBERS,
AND STAFF VACANCIES IN DEPARTMENTS OF PHARMACOLOGY OF 96 SCHOOLS
OF MEDICINE. DATA FOR 1959-1960.

	Total	Median	Mode	Range limits
Total full-time positions	626	6	5	1-22
Full-time positions filled and supported 50 per cent or more by university budget	392	4	3	0-9
Full-time positions filled and supported 50 per cent or more by grants or fellowships	160	1	0	0-18
Full-time positions vacant, to be supported 50 per cent or more by university budget	53	0	0	0-3

The 626 full-time staff members in departments of pharmacology were so distributed among the departments that the modal number of full-time department members was five; at least one department had only one full-time staff member, and at least one had 22 (Table 4). Data not tabulated here showed that 25 per cent of departments had four full-time members or less, and 25 per cent had eight full-time members or more. Sixty-three per cent of full-time staff members were supported to the extent of 50 per cent or more from university funds; the modal number of such persons in a department was three. Twenty-six per cent of full-time staff members were supported to the extent of 50 per cent or more by funds obtained from grants or fellowships; the modal number of such persons in a department was 0 (zero), but ranged as high as eighteen.

Most of the departments had no vacant, full-time positions (supported to the extent of 50 per cent or more by the university budget), but a total of 53 such positions were vacant in the 96 schools surveyed (Table 4).

Trainees and graduates.—In 1958-1959 and in the 3 preceding years, the total number of M.S. degrees in pharmacology received after training in medical schools varied between 27 and 45 per year; the number of Ph.D. degrees varied between 48 and 57 per year. In each year since 1955-56 the total number of M.S. and Ph.D. candidates and the total number of trainees not working toward degrees has increased steadily. Almost twice as many students were receiving advanced training in pharmacology in medical schools in 1959-1960 as received such training in 1955-1956 (Table 5).

For 1958-1959 and the 8 preceding

TABLE 5

TOTAL NUMBER OF STUDENTS WHO RECEIVED ADVANCED DEGREES AND ADVANCED TRAINING WITHOUT DEGREES IN ALL DEPARTMENTS OF PHARMACOLOGY IN SCHOOLS OF MEDICINE FROM 1955-1956 TO 1959-1960

Only 87 of 96 departments responding may give training leading to a degree conferred by their institution.

YEAR	MASTER'S DEGREES		PH.D. DEGREES		NOT WORKING TOWARD M.S. OR PH.D. DEGREE			TOTAL
	No. candidates	Degrees granted	No. candidates	Degrees granted	Students in professional schools	Other	Post- doctoral students	
1955-56	72	34	146	50	89	1	45	353
1956-57	93	41	147	57	94	1	62	397
1957-58	91	27	172	48	113	1	71	448
1958-59	117	45	192	50	133	6	99	547
1959-60	120	---	221	---	171	5	153	670

years, from 24 to 44 M.S. degrees in pharmacology were granted each year to students trained in medical schools; between eighteen and 57 Ph.D. degrees in pharmacology were granted. In any one year, the majority of schools did not grant a M.S. degree in pharmacology; similarly, the majority granted no Ph.D. degree in pharmacology. The maximum number of M.S. degrees granted per school per year has decreased since 1950-1951, but this is not true for Ph.D. degrees. Adjustment of the total number of degrees granted per year, according to the number of respondent schools for each year, indicates that the rate of granting of the M.S. degree (per year per 100 schools) declined since 1950-1951; the rate of granting of Ph.D. degree increased since 1950-1951 (Table 6).

Three-year moving averages of rate of granting M.S. degrees (degrees per year per 100 schools) indicate that the rate declined from 58.9 to 35.9 from 1951-1953 to 1954-1956, but has remained essentially constant since 1954-1956. The number of M.S. degrees granted per school (among schools which have granted one or more degrees each year) declined from 1951-1953 to 1954-1956 but has remained virtually constant since. The per cent of respondent schools which granted no M.S. degrees

was essentially constant from 1951-1953 to 1955-1957, but may have decreased slightly since then. With respect to M.S. degrees, the rate of production (degrees per year per 100 schools) has declined since 1951-1953, probably because fewer degrees per school have been granted rather than because fewer schools have granted such degrees (Table 7).

Three-year moving averages of rate of granting Ph.D. degrees (degrees per year per 100 schools) increased from 1951-1953 to 1953-1955 but has hardly changed since then. The number of Ph.D. degrees granted per school (among schools which granted one or more degrees per year) was virtually constant from 1951-1953 to 1956-1958, but may have decreased since then. The per cent of schools which granted no degrees declined almost continuously from 1951-1953 until 1957-1959. With respect to Ph.D. degrees, the rate of production (degrees per year per 100 schools) has probably increased because progressively more schools have granted at least one degree rather than because the number of degrees granted per year through each department has increased (Table 7).

There seems no reason to believe that the trends in the data of Table 7 are artifacts, the results of pooling data

TABLE 6
NUMBER OF M.S. AND PH.D. DEGREES GRANTED AFTER TRAINING IN MEDICAL SCHOOL
DEPARTMENTS OF PHARMACOLOGY FOR EACH ACADEMIC YEAR FROM 1950-1951
THROUGH 1958-1959

Year	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59
Total M.S. degrees granted	44	41	42	28	24	34	41	27	45
Number of respondents	72	72	72	72	72	96	96	96	96
Number of schools granting one or more M.S. degrees	21	16	15	18	14	25	29	22	27
Number of schools granting two or more M.S. degrees	9	10	10	5	6	8	10	3	14
Range of number of M.S. degrees granted by individual schools	0-9	0-7	0-8	0-3	0-3	0-3	0-3	0-4	0-3
Total Ph.D. degrees granted	18	26	34	43	34	50	57	48	50
Number of respondents	72	72	72	72	72	96	96	96	96
Number of schools granting one or more Ph.D. degrees	6	16	14	20	14	31	36	30	30
Number of schools granting two or more Ph.D. degrees	3	4	11	10	8	11	14	10	12
Range of number of Ph.D. degrees granted by individual schools	0-4	0-4	0-5	0-5	0-4	0-4	0-6	0-4	0-5
Number of M.S. degrees granted per 100 respondents	61.2	57.0	58.4	38.9	33.4	35.4	41.5	28.1	46.8
Number of Ph.D. degrees granted per 100 respondents	25.0	36.2	47.3	59.9	47.3	52.0	59.3	50.0	52.0

TABLE 7

THREE-YEAR MOVING AVERAGES OF NUMBERS OF M.S. AND PH.D. DEGREES, RESPECTIVELY, RECEIVED AFTER TRAINING IN MEDICAL SCHOOL DEPARTMENTS OF PHARMACOLOGY
 Three-year moving averages of M.S. and Ph.D. degrees granted per school, for those schools which granted one or more of such degrees. Three-year moving averages of per cent of responding schools which granted no degrees. Total number of degrees granted are adjusted numbers per 100 respondents. For data through academic year 1954-55, there were 72 respondents; for years 1955-56 through 1958-59, 96 respondents.

Years (inclusive dates)	NO. DEGREES GRANTED		NO. DEGREES GRANTED PER SCHOOL		PER CENT SCHOOLS GRANTING NO DEGREES	
	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.
1951-1953	58.9	36.2	1.99	1.87	75.7	83.3
1952-1954	51.4	47.8	1.83	1.75	77.3	76.9
1953-1955	43.6	51.5	1.58	1.96	78.2	77.7
1954-1956	35.9	53.1	1.34	1.93	76.5	73.5
1955-1957	36.8	52.9	1.37	1.84	74.8	70.2
1956-1958	35.0	53.8	1.30	1.74	73.6	66.3
1957-1959	38.8	53.8	1.44	1.65	72.9	66.7

from two questionnaires having different numbers or kinds of respondents. Were the data for each column of the table to be graphed with respect to time, it could be seen that the presence (or absence) of flexion points in the graphs, and the time of their occurrence, is unsystematic.

Sources of degree candidates.—Pooled data (for schools of medicine, pharmacy, veterinary science, and dentistry) indicate that, for the 5 years up to and including 1959-1960, the major source of candidates for the M.S. degree in pharmacology was students and graduates in pharmacy (50 per cent of total candidates); 14 per cent of the candidates were medical students or graduates, and only 3 per cent were premedical students who had not been accepted in medical schools. Similar data indicate that the major sources of candidates for the Ph.D. degree in pharmacology were students or graduates in pharmacy or graduates of liberal arts colleges (each about 36 per cent of total candidates). The next most important source of Ph.D. candidates (12 per cent of total candidates) were persons with M.S. degrees in fields other than pharmacology (91 per cent of such Ph.D. candidates were candidates in a medical school rather than a school of pharmacy, den-

tistry, or veterinary science). Medical students and graduates, the third most important source of Ph.D. candidates, were 8 per cent of the total. Premedical students not accepted in medical schools provided less than 1 per cent of the Ph.D. candidates (Table 8).

About 13 per cent of persons who have received M.S. or Ph.D. degrees in pharmacology during the past 5 years, after training in medical schools in the United States, were not citizens of the United States. More than half of those who received more than 3 months of postgraduate training in a United States medical school were not United States citizens. Of those who received either degrees or postgraduate training in pharmacology in the United States medical schools, 68 per cent were United States citizens (Table 9).

Employment of graduates.—Of the total graduates in pharmacology (M.S. and Ph.D.) from medical school departments, who received their degrees since 1955, 53 per cent (of 372) were employed in academic fields at the time of the survey of 1959-1960, 141 or 38 per cent in academic pharmacology. Thirty-two, or 9 per cent, were employed by the United States Government, including the Armed Forces. The pharmaceutical industry employed 62, or 17 per cent

TABLE 8

SOURCES OF ALL DEGREE CANDIDATES IN PHARMACOLOGY FOR FIVE-YEAR PERIOD UP TO AND INCLUDING 1959-60

Pooled data for 96 medical schools responding, 69 pharmacy schools responding, nineteen schools of veterinary science responding, and 29 schools of dentistry responding.

SOURCE OF STUDENTS	CANDIDATES FOR MASTER'S DEGREE		CANDIDATES FOR PH.D. DEGREE	
	No.	No. as per cent of total (per cent)	No.	No. as per cent of total (per cent)
Medical school students	59	9.7	15	2.3
Medical school graduates	23	3.8	38	5.8
Premedical students not accepted in medical school	19	3.1	5	0.8
Students or graduates in pharmacy	301	49.5	232	35.6
Graduates of liberal arts colleges	139	22.9	233	35.8
Technicians in academic institutions	15	2.5	8	1.2
Technicians in nonacademic institutions	7	1.2	15	2.3
Veterinary school students or graduates	25	4.1	17	2.6
Students with M.S. degrees in fields other than pharmacology	4	0.7	76	11.6
Other sources	16	2.6	13	2.0
Total:	608	100.1	652	100.0

of these graduates. Twenty-two, or 6 per cent, were engaged in the nonacademic practice of medicine, pharmacy, etc. Fifty-nine, or 16 per cent of these graduates, were employed by research institutes or industries other than the pharmaceutical industry, or were engaged in other activities including further academic training (Table 10).

Distribution of places of employment within 5 years of receiving a degree in pharmacology was also investigated during the 1954-1955 survey. The percentage of graduates employed in academic medicine was virtually identical for the two 5-year periods. During the second survey period, as contrasted with the earlier, a somewhat larger fraction of the recent graduates have found employment

in the pharmaceutical industry, and a somewhat smaller fraction has entered the nonacademic practice of medicine, pharmacy, dentistry, etc. (Table 10).

Support of graduate education.—Of 87 medical schools, 53 received direct university-budgeted financial support of predoctoral students; for only 29 did this source provide more than 25 per cent of the total of such support. Fifty-one schools received training grants or fellowships from the United States Public Health Service (U.S.P.H.S.); in twenty this source provided 50 per cent or more; and in six, 100 per cent of the total predoctoral support. U.S.P.H.S. research grants provided support of predoctoral students in 42 schools; in only eleven did this source provide 25 per

TABLE 9

CITIZENSHIP STATUS (AT THE TIME TRAINING WAS RECEIVED) OF PERSONS WHO RECEIVED ADVANCED TRAINING IN PHARMACOLOGY IN THE 84 UNITED STATES MEDICAL SCHOOLS DURING 1955-1960

	No. U.S. citizens	No. not U.S. citizens	Total	U.S. citizens (per cent of total)	Not U.S. citizens (per cent of total)
Received only M.S. degree	113	16	129	87.6	12.4
Received only Ph.D. degree	169	27	196	86.2	13.8
Received postgraduate training for 3 months or longer	133	151	284	46.8	53.2
Received Ph.D. degree or postgraduate training	302	178	480	63.0	37.0
Received M.S., Ph.D., or postgraduate training	415	194	609	68.2	31.8

TABLE 10

EMPLOYMENT WITHIN 1-5 YEARS OF GRADUATION OF PERSONS WHO RECEIVED ADVANCED DEGREES IN PHARMACOLOGY (EITHER M.S. OR PH.D.) FROM MEDICAL SCHOOLS DURING EACH OF TWO FIVE-YEAR PERIODS

In the questionnaires distributed in 1954-55 and 1959-60, respectively, respondents were asked to report the "present employment" of their graduates of the previous 5 years. There were 72 respondents in 1954-55 and 96 in 1959-60. Schools of medicine in Canada were not surveyed in 1954-55.

EMPLOYMENT	RECEIVED DEGREE DURING 1950-1955			RECEIVED DEGREE DURING 1955-1960		
	Number	Per cent*	Total per cent	Number	Per cent*	Total per cent
Academic:	120	39.8		141	37.9	
Pharmacology						
Academic: Other	27	8.8	52.6	26	6.9	53.0
preclinical fields						
Academic: Clinical	12	3.9		30	8.6	
fields						
U.S. Government (ex- cept Armed Forces)	34	11.1		24	6.5	
			15.2			8.6
Armed Forces	12	3.9		8	2.2	
Pharmaceutical	31	10.2	10.2	62	16.7	16.7
industry						
Nonacademic practice of medicine, pharmacy, etc.	37	12.1	12.1	22	5.9	5.9
Research institutes	No specific data			20	5.5	
Industry: Other than pharmaceutical	No specific data		9.8	4	1.1	15.8
Other	29	9.8		35	9.4	
Total:	302		99.9	372		100.0

* As per cent of total.

TABLE 11

FINANCIAL SUPPORT OF PREDOCTORAL STUDENTS

Number of medical school pharmacology departments, out of 87, receiving various percentages of total support from seven sources; 96 respondents, of which only 87 can give training leading to a graduate degree conferred by their institution.

SOURCE OF SUPPORT IN 1959-1960	NO. SCHOOLS RECEIVING SUPPORT TO THE FOLLOWING EXTENT OF TOTAL FINANCIAL SUPPORT OF PREDOCTORAL STUDENTS IN THE RESPECTIVE SCHOOLS (PER CENT)					
	0	1 or more	25 or more	50 or more	75 or more	100
University budget	34	53	29	11	6	1
U.S.P.H.S. training grants or fellowships	36	51	38	20	18	6
U.S.P.H.S. research grants	45	42	15	11	2	2
Grants from other government agencies	69	18	11	8	5	0
Grants from pharma- ceutical companies	57	30	9	4	0	0
Grants from nonprofit institutions	59	28	9	1	0	0
Other	80	7	6	4	3	2

cent or more of such support. Thirty schools received some financial support of predoctoral students from pharmaceutical companies; in only nine did this source provide more than 25 per cent of the total support. Support of predoctoral students was received from nonprofit institutions by 28 schools, in only nine of which this source provided 25 per cent or more of the total. Only eighteen and seven schools received financial support of predoctoral students from government agencies other than the U.S.P.H.S. or from miscellaneous sources, respectively; in most such schools these sources provided rather more than 25 per cent of the total support (Table 11).

Relatively fewer privately endowed schools than state-supported schools made any direct contribution to financial support of predoctoral students in pharmacology. Relatively more private than state schools used U.S.P.H.S. training grants and fellowships and U.S.P.H.S. research grants to support predoctoral training in pharmacology. In private schools U.S.P.H.S. research and training grants and fellowships contributed a larger share of funds for predoctoral training than they did in the state-supported schools. Grants from other gov-

ernment agencies, pharmaceutical companies, and nonprofit institutions were enjoyed by similar proportions of state and private schools, and these sources made relatively smaller contributions to predoctoral training than did universities or the U.S.P.H.S. (Table 12).

Comparison of state and private schools.—In both state and private medical schools total academic staff and total staff participating in graduate education have increased more than 100 per cent since 1955-1956; the rate of increase of both categories of staff members has been greater in private schools. In contrast, although the number of predoctoral students and nondegree students has increased more than 100 per cent since 1955-1956 in both state and private schools, and the number of postdoctoral trainees has more than trebled in both, the rates of increase have been greater in state than in private schools.

Fewer M.S. degrees per year have been granted by private as compared with state schools, and relatively fewer private schools have granted M.S. degrees than is true of state schools; for neither category of schools was there a clear trend with time of the total number of M.S. degrees granted in the years since 1955-1956.

TABLE 12

PER CENT OF 45 STATE-SUPPORTED MEDICAL SCHOOLS (S) AND 35 PRIVATELY ENDOWED MEDICAL SCHOOLS (P) RECEIVING VARYING DEGREES OF FINANCIAL SUPPORT OF TRAINING IN PHARMACOLOGY FROM EACH OF SEVERAL SOURCES

SOURCE OF SUPPORT IN 1959-60		PER CENT OF SCHOOLS RECEIVING SUPPORT TO THE FOLLOWING EXTENT OF TOTAL FINANCIAL SUPPORT OF PREDOCTORAL STUDENTS IN THE RESPECTIVE SCHOOLS					
		0	1 or more	25 or more	50 or more	75 or more	100
University budget	S	36	65	40	13	7	0
	P	54	46	23	9	6	0
U.S.P.H.S. training grants or fellowships	S	49	51	49	29	17	4
	P	40	60	54	37	26	9
U.S.P.H.S. research grants	S	60	40	17	9	2	2
	P	46	54	29	9	3	3
Grants from other government agencies	S	82	18	13	9	7	0
	P	83	17	6	3	0	0
Grants from pharmaceutical companies	S	71	29	11	7	0	0
	P	69	31	6	0	0	0
Grants from non-profit institutions	S	73	27	7	0	0	0
	P	69	31	9	3	0	0
Other	S	87	13	11	7	7	4
	P	100	0	0	0	0	0

Roughly the same proportion of private as state schools have granted Ph.D. degrees; the number of degrees per year granted by schools of both types has remained virtually constant from 1955-1956 through 1958-1959.

The *increment* in total staff positions held in state-supported schools from 1955-1956 through 1958-1959 averaged 21.3 per year (range: 17-26 per year); during these years the number of Ph.D. degrees granted by state schools averaged 25 per year (range: 22-28 per year). In contrast, in privately endowed schools the *increment* in total staff positions averaged 30.6 per year (range: 10-48 per year) over the same period of years; and the total number of Ph.D. degrees granted per year by private schools averaged 21.8 (range: 21-23 per year) (Table 12).

Greater insight into the changing status of predoctoral and postdoctoral training in pharmacology in state-supported and privately endowed schools, respectively, can be gained by using the

absolute data of Table 13 to compute ratios to compare relative changes in staff, trainees, and graduates. It should be pointed out that these ratios (summarized in Table 14) are ratios of sums, not the means, of ratios computed individually for each school in each category.

The proportion of total staff engaged in graduate education ("graduate staff") is about the same in both privately endowed and state-supported schools, and shows no clear trend with time since 1955-1956 (Table 14).

The number of predoctoral (and pre-M.S.) trainees and nondegree trainees per graduate staff member has increased year by year in state schools. In contrast, this ratio has decreased since 1955-1956 in privately endowed schools; and in 1959-1960 was just half as great as the ratio which obtained in state schools. However, in private schools the ratio of postdoctoral trainees to graduate staff members has been consistently larger than in state schools, although

TABLE 13

COMPARISON OF THE GROWTH OF ACADEMIC STAFF AND TRAINING IN PHARMACOLOGY IN
45 STATE-SUPPORTED SCHOOLS (S) AND 35 PRIVATELY ENDOWED SCHOOLS (P) FROM
1955-56 TO 1959-60

	STATE SCHOOL (S) OR PRIVATE SCHOOL (P)		ACADEMIC YEAR		1959-60 as per cent of 1954-55
			1956-57	1957-58	
Total staff members (instructor and above)	S	190	216	237	139
	P	158	168	202	164
Total staff partici- pating in graduate education	S	138	149	162	147
	P	104	121	146	184
Total students receiv- ing predoctoral (in- cluding pre-M.S.) training and nonde- gree training not at postdoctoral level	S	154	164	184	174
	P	82	91	105	164
Total postdoctoral trainees	S	18	25	29	339
	P	26	37	41	300
Number of M.S. de- grees granted	S	21	30	21	30
	P	11	8	5	8
Number of Ph.D. de- grees granted	S	25	28	22	25
	P	21	23	21	22
Per cent of schools which granted no M.S. degree	S	62%	53%	64%	67%
	P	83%	83%	86%	83%
Per cent of schools which granted no Ph.D. degree	S	64%	58%	64%	67%
	P	63%	63%	71%	63%

TABLE 14
COMPARISON OF RELATIVE GROWTHS OF ACADEMIC STAFF AND TRAINING IN PHARMACOLOGY
FOR 45 STATE-SUPPORTED SCHOOLS (S) AND 35 PRIVATELY ENDOWED SCHOOLS (P) FROM
1955-56 TO 1959-60

	STATE SCHOOL (S) OR PRIVATE SCHOOL (P)	ACADEMIC YEAR			
		1955-56	1956-57	1957-58	1958-59
No. graduate staff members	S	0.73	0.69	0.68	0.73
Total number of staff members	P	0.66	0.72	0.72	0.70
No. predoctoral (and pre-M.S.) trainees and nondegree students per graduate staff member	S	1.12	1.10	1.14	1.19
	P	0.79	0.75	0.72	0.66
No. postdoctoral trainees per graduate staff member	S	0.13	0.17	0.18	0.20
	P	0.25	0.31	0.28	0.31
Total trainees per graduate staff member	S	1.25	1.27	1.31	1.40
	P	1.04	1.06	1.06	0.97
Total trainees per staff member (total staff)	S	0.90	0.87	0.90	1.02
	P	0.68	0.76	0.76	0.67
No. M.S. degrees per graduate staff member	S	0.15	0.21	0.13	0.16
	P	0.11	0.07	0.03	0.05
No. Ph.D. degrees per graduate staff member	S	0.18	0.19	0.14	0.13
	P	0.20	0.19	0.14	0.13
No. M.S. degrees per school	S	0.47	0.67	0.47	0.67
	P	0.31	0.23	0.14	0.23
No. Ph.D. degrees per school	S	0.56	0.62	0.49	0.56
	P	0.60	0.66	0.60	0.63
No. postdoctoral trainees per school	S	0.40	0.56	0.64	0.84
	P	0.74	1.06	1.17	1.54
					1.35
					2.23

there has been a general increase in this ratio in both types of schools since 1955-1956.

With respect to the total number of trainees in pharmacology, expressed relative to either total staff members or graduate staff members, the ratio was larger for state-supported than for privately endowed schools in every year since 1955-1956. There has been a trend for this ratio to increase, year by year, for state schools; there has not been so clear-cut a trend for this ratio to increase progressively in the case of private schools.

The number of M.S. degrees granted per year per graduate staff member has been consistently lower in the privately endowed schools; the number of M.S. degrees granted per year per school is also less in the case of private schools. The number of Ph.D. degrees granted per year per graduate staff member has been virtually identical in both state and private schools since 1955-1956, although the number of Ph.D. degrees granted per year per school has been slightly but consistently lower for state schools since 1955-1956. In contrast, the number of postdoctoral trainees per year per school has been consistently almost twice as high in private as in state schools in every year since 1955-1956, even though the ratio has been increased year by year for both kinds of schools (Table 14).

Manpower needs in pharmacology.—One of the major goals of the Committee on Educational Affairs, in surveying graduate education in pharmacology, has been to obtain data which might permit estimation of the need for pharmacologists relative to the number of persons trained in pharmacology each year. For the present discussion we shall consider the number of persons trained in pharmacology each year to be the number of persons each year who receive Ph.D. de-

grees after training in departments of pharmacology in medical schools, regardless of what other degrees or training the persons might have. This is not to disparage the role of other forms of training in producing "pharmacologists," but to simplify our discussion and to recognize that disciplined training in pharmacology—and other sciences—is usually considered to be graduate (rather than postgraduate) in nature and of a duration and intensity which qualifies the student for a doctor's degree. Restricting our discussion in this way also emphasizes, appropriately, the present dominant role played by medical schools in the training of pharmacologists (Table 1).

During the years 1955-1956 through 1959-1960, about 53 new staff positions in departments of pharmacology were filled each year in medical schools of the United States and Canada. Thirty-nine of these new positions, on a yearly average, were filled by persons who held Ph.D. degrees, with or without other degrees (Table 2). We can anticipate that approximately this number of positions will be available each year in the future. To the extent that medical school enrollments increase within the next few years, more pharmacologists will be needed on medical school faculties. There is, in addition, a "backlog" of at least 36 unfilled, budgeted full-time positions in medical school departments of pharmacology in the United States and Canada; in the United States at least, the number of such positions has tended to increase year by year since 1955-1956 (2). The survey of the Committee indicates the number of these vacant full-time positions in academic pharmacology in 1959-1960 was closer to 53 than to 36 (Table 4).

From the data obtained from the questionnaire circulated by the Committee on Educational Affairs to representative

members of the pharmaceutical industry, it can be estimated that for the 5 years succeeding 1959-1960, expansion of departments of pharmacology in this industry will provide employment opportunities for about ten persons per year who have received doctorates in pharmacology (1).

It can be estimated, therefore, that, in departments of pharmacology in medical schools and in the pharmaceutical industry, there is a potential need of about 49 persons per year who have received a Ph.D. in pharmacology. A tabulation analogous to that of Table 9 was made for survey data for the period of 1955-1960, but the data were limited to persons who had received a Ph.D. in pharmacology during the 5-year period. Of the 240 such graduates present employment was known, 115 or 48 per cent were employed in academic departments of pharmacology, and 46 or 19 per cent were employed in the pharmaceutical industry. The 49 persons per year who can be anticipated to find employment in departments of pharmacology in medical schools and the pharmaceutical industry will, therefore, account for about 67 per cent of the total number of such persons who will find employment. Hence, it would appear that, within the next few years, the total number of positions available to persons with a Ph.D. in pharmacology will approximate 73 per year.

During the 4 academic years from 1955-1956 through 1958-1959, inclusive, an average of 51 Ph.D.'s in pharmacology have been granted per year to persons trained in medical school departments of pharmacology (Table 5); of these an average of 49 received their training in a medical school in the United States (Table 8). Of those who received training in the United States, about one in seven was not a United States citizen at the time the training was received

(Table 8). Hence, only about 42 persons per year received a Ph.D. in pharmacology and also were readily available for employment in the United States. These 42 persons awarded a Ph.D. in pharmacology thus could fill only 58 per cent of 73 positions estimated to be available per year in the United States and Canada.

The discrepancy between the estimated demand for pharmacologists and the number of persons trained in pharmacology has been met, and could continue to be met, in a number of ways. Some 19 per cent of full-time staff members in United States medical school departments of pharmacology received a major part of their training in pharmacology outside of the United States; 17 per cent received their training in the United States but not in a medical school (Table 3). Persons with postgraduate training in pharmacology may help supply the need for pharmacologists, but only about 50 per cent of persons who have received such training were citizens (of the United States) at the time they received the training and therefore are not readily available to the employable "pool" of pharmacologists in the United States (Table 8). Persons trained in fields other than pharmacology can and do make important contributions to research and teaching in pharmacology, but their number is difficult to estimate; in the departments of pharmacology in the segment of the pharmaceutical industry surveyed by the Committee, only about one-third of those employees with doctor's degrees had received a doctorate in pharmacology (1). However, the year-by-year increase in unfilled positions in medical school departments of pharmacology indicates that the demand for pharmacologists has not been satisfied even by persons trained in sciences other than pharmacology.

It is difficult to foretell the degree to which the need for pharmacologists will

increase in academic medicine and in pharmaceutical industry; no estimates for future needs for pharmacologists in government, in research institutes, or in industries other than pharmaceutical industry are available. Based on the trend of our survey's data for the last decade, however, it is reasonable to conclude that fulfilling of the demands for pharmacologists with persons trained in pharmacology will require at least a 50 per cent increase, perhaps even a

doubling, of the present yearly output of persons with Ph.D. degrees in pharmacology.

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Studies of Comprehensive Medical Care for Handicapped Children. II. Relationships of Doctors-in-Training with Pediatric Out-Patients*

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A study of comprehensive medical care for handicapped children included as one of its primary goals an objective evaluation of doctor-patient relationships in a pediatric out-patient setting. Systematic observation of 150 doctor-patient contacts was conducted in order to obtain factual information descriptive of clinic experiences of pediatric patients and their mothers; and to evaluate interactions between clinic physicians, mothers, and children. In the analysis of these data certain trends emerged which pointed toward differences in patient relationships established by doctors in various stages of graduate training.

Recent studies by Blum (3) and others (1, 4) illustrate the importance of successful management of the doctor-patient relationship to good medicine. Furthermore, the pediatric out-patient department has been cited by those concerned with medical education as a particularly favorable environment for the

development of skills in this area for the medical student (8, 10) and even more so for the graduate pediatrician in the later years of his formal training (7). How well the young physician progresses in the development of his own attitudes and approach toward pediatric patients during the course of his graduate training is of utmost importance to his ultimate success in medicine, regardless of his eventual area of specialization. In consideration of these factors, therefore, it was decided to attempt to identify and evaluate the ways in which physicians in various training categories do relate to patients and their mothers in the pediatric out-patient department. In this regard 80 observations of patient visits handled by interns, residents, and fellows were analyzed in respect to factors common to the group as a whole, as well as to factors attributable to differences in the levels of experience of the three categories of examining doctors.

PROCEDURES

The setting.—The pediatric out-patient department at the University of Colorado Medical Center consists of a general pediatric clinic and a number of specialty clinics. This report is based on observations conducted in the General Pediatric Clinic and in four of the

* Presented in part at the Fourth Out-patient Research Workshop, Pittsburgh, Pennsylvania, March 10, 1961.

This study was supported by a research grant from The Sister Elizabeth Kenny Foundation.

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TABLE 1
DISTRIBUTION OF PATIENT CONTACTS BY CATEGORY OF DOCTOR AND BY CLINIC

	General pediatric	Neurology	Rheumatic fever	Congenital heart	Allergy	Totals
Interns	11	2	7	0	0	20
Residents	14	11	6	9	0	40
Fellows	1	0	1	5	13	20
Totals	26	13	14	14	13	80

specialty clinics—specifically, Allergy, Congenital Heart, Neurology, and Rheumatic Fever.

Twenty patient visits handled by pediatric and medical fellows, 40 by pediatric residents, and twenty by rotating interns were evaluated, these contacts being distributed among the five clinics, with twice as many observations in General Pediatric Clinic as in any one of the equally represented specialty clinics.

Case selection.—This study, extending over a period of 3 years, was part of a larger investigation, described elsewhere (5), which included a recorded interview with each mother and child and doll play procedures with the children. Case selection was based entirely on patient criteria and on the mother's ability to participate in the other study procedures. The children, all of whom were accompanied by their mothers, were white, age 4 through 11, and had attended the particular clinic at least once prior to the visit which served as the source of the data here presented.

The identity or status of the doctor assigned to the child was not a consideration in case selection. It evolved, therefore, that several of the physicians were observed in a number of contacts with different patients. On this basis, prejudice of the findings regarding the doctors cannot be discounted. However, this randomly selected physician group was thought to represent a reasonable sampling of the professional environment to which pediatric clinic patients are generally exposed.

Doctor-patient observation.—The child and mother in each instance were accompanied to the examining room by one of the members of the study group, which consisted of a pediatrician, a clinical psychologist, and a medical social worker. The observer, who wore a white coat, noted the interaction between mother, child, and clinic physician throughout the visit but did not take an active part in the proceedings.

It was recognized that the presence in the examining room of a nonparticipating person whose identity was unknown to the patient and mother may have somewhat inhibited their natural behavior or expression of feelings, and possibly the doctor's as well. However, since the doctors and the patients in these clinics were not unaccustomed to the presence in the examining room of other doctors, nurses, students, and social workers, it was felt that, on the whole, the observer was accepted as merely another interested medical person.

Immediately following the completion of the clinic visit the observer's impressions were recorded on a form devised to assure (a) a substantive record of the details of the visit, (b) a qualitative evaluation of certain specific aspects of the interactions, and (c) a quantitative assessment, where pertinent, of these measures of the interplay between doctor and patient, utilizing 3- or 5-point scales constructed on the basis of principles previously established by the study group.

As others have pointed out, interpretations based on individual judgments

and impressions are subject to the possibility of bias related to professional discipline, or personal bent of the observer (2, 9). Even though the study group was aware of the potential for problems of validity and reliability occurring as a consequence of this method of obtaining data, it was felt that an effort to improve reliability by introducing more than one observer into the examining room setting would constitute a further strain on the doctor-patient interaction and possibly prejudice the findings even more. Consequently, after a few experiences involving the presence of two observers, this approach was abandoned in favor of the single observation. It was felt that the consistency of group trends that obtained in the face of these difficulties lent conviction to the interpretations of the individual observer.

FINDINGS

Details of the clinic visit.—The factual characteristics of the clinic experiences of this group of 80 patients were noted to be as follows:

1. The mother was the only one to accompany the child to the examining room in 78 per cent of the cases. On only one occasion did the child's father take part in the visit with the doctor, although in a number of instances the father, having brought the mother and child to the clinic, waited outside.

2. In one-half of the cases no clinic personnel other than the doctor in charge and the observer were present at any time in the examining room, although there were four instances in which eight or more additional persons were present during some part of the visit.

3. Fifty-four per cent of the children were examined by only one doctor. In five cases, however, as many as five and six doctors took part in the examination.

4. Staff consultants attended 31 of the

cases, supervising one-quarter of the fellows, one-half of the residents, but fewer than half of the interns.

5. The length of time the doctor in charge left the room averaged 5 minutes. There was one instance, however, in which the mother and child were left alone for over 45 minutes.

6. The total length of the clinic visit was found to be less than 30 minutes in over half of the cases; however two visits were well over 2 hours long. Seventy per cent of the visits handled by the fellows lasted over 30 minutes; however only 35 per cent of the residents' contacts and but 15 per cent of the intern visits were of this duration. It is relevant that none of these 80 visits was scheduled for the purpose of conducting an extensive history-taking and physical examination.

Establishment of rapport.—Specific positive attributes of the physician's manner in the establishment of rapport with mother and child were evaluated, including qualities such as interest, seriousness, pleasantness, unhurriedness, confidence, familiarity with the case, and evidence on the doctor's part of being well organized. The doctor's responsiveness to the child and the mother was also considered, taking into account such factors as his comfortableness with the mother and with the child, his attentiveness to the child, the skill in his efforts to put the patient at ease, and his method of preparing the child for steps in the examination and potentially frightening procedures. Where there was evidence of the negative expression of these traits, attitudes, and techniques, this was also recorded.

As is shown in Charts 1 and 2, the fellows, as a group, exhibited these positive qualities more consistently than did the residents, who in turn evidenced them more frequently than did the interns. The validity of these trends is

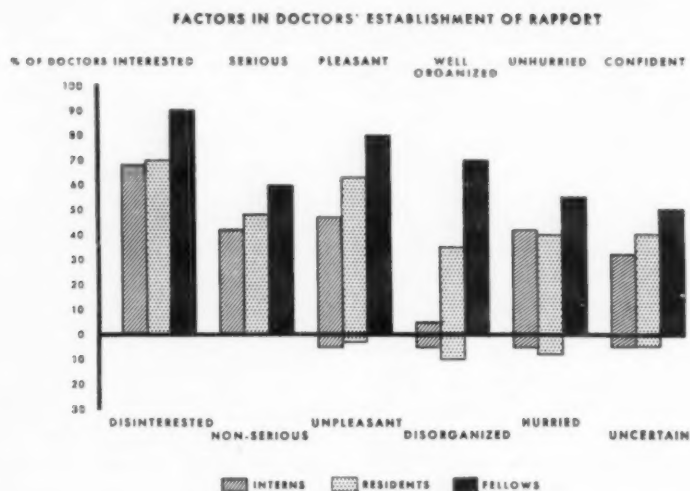


CHART 1.—Factors in the establishment of rapport with children and their mothers as evidenced by interns, residents, and fellows.

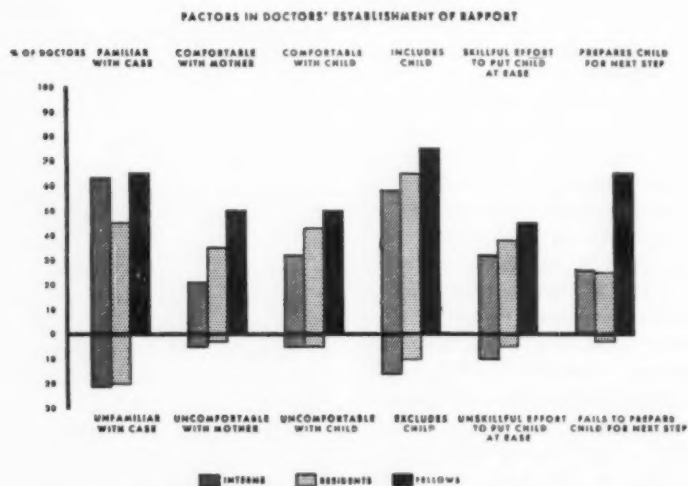


CHART 2.—Factors in the establishment of rapport with children and their mothers as evidenced by interns, residents, and fellows.

strengthened by the demonstration of a converse relationship in regard to evidence of the negatively valued qualities, a tendency which was noted in spite of a minimal total expression of such characteristics.

Complexity and clarity of communication.—In relation to doctor-patient communication, various aspects of the verbal interchange between doctor and mother and child were assessed. One factor considered was the complexity of the doctor's explanations, which of course varied considerably in degree. The scale ranged from a simple statement of fact or an uncomplicated direction without detailed explanation, to discussion in several areas, often including elaborate explanations of physiologic or anatomic aspects of the child's condition. Rating of the 80 doctor-patient contacts on a 5-point scale revealed a mean complexity of 2.43, suggesting that on the whole the doctors' communications approached a moderate degree of complexity.

Another factor evaluated was the clarity of communication, and in this rating consideration was given to the simplicity of words and phrases, the use of technical words, the speed of

presentation, and the response of the doctor to evidence of lack of understanding on the part of the mother and child. On a 5-point scale a mean of 3.44 indicated that a moderate degree of clarity characterized the over-all group of doctors.

An analysis of complexity and clarity in terms of differences among the three categories of doctors is illustrated in Chart 3, which shows that the fellows' communications appeared to be more complex than the residents', an observation of particular interest in view of the fact that the fellows achieved a greater clarity of communication. The residents' communications were in turn more complex but nonetheless more clearly imparted than were those of the interns, whose statements, although the least complicated, were, however, the least clearly presented. These trends, however, were not found to be statistically significant.

Reassurance and support.—A rating of the doctor's reassurance and support of the mother and child was based on an assessment of the substance and scope of the advice given and the doctor's manner in offering it. In this evaluation

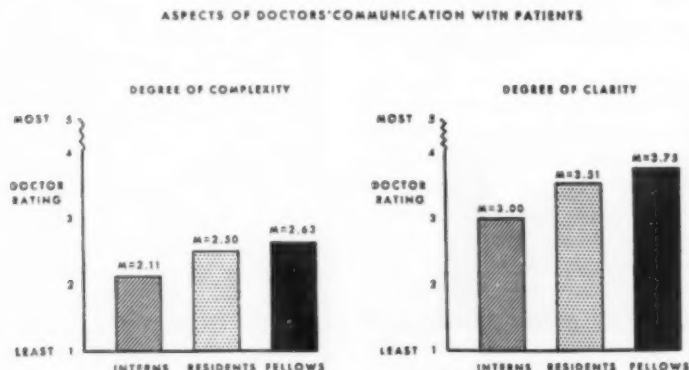


CHART 3.—Differences in mean degree of complexity and clarity of doctors' communications with children and their mothers as evidenced by interns, residents, and fellows.

TABLE 2
DOCTOR'S REASSURANCE AND SUPPORT OF MOTHER AND CHILD

	Per cent
1. None given, in spite of clear indication of need.	8
2. Some given, mainly factual comments concerning the physical aspects of condition—implications of symptoms and physical findings, progress of illness, test reports, effectiveness of medicine.	28
3. Moderate amount given. Doctor responsive also to emotional needs of child and mother, expresses sympathy, empathy, understanding, approval. Gives assurance of continuity of care.	41
4. Considerable amount of reassurance or support given.	20
5. A great deal of appropriate support given, in positive forceful manner. Doctor speaks or acts with conviction, authority, and confidence.	3
Total:	100
Mean = 2.81	

note was made as to whether the doctor's support was restricted largely to the physical aspects of the child's condition, or whether he was also responsive to social-emotional needs of the child and mother and endeavored to assist them in these areas. The doctor's expression of understanding, empathy, and of his availability for help were noted. The appropriateness of the doctor's efforts in this direction was also assessed, as there was, of course, wide variation among the mothers and children in their need for reassurance and support. When the ratings were categorized on a 5-point scale, as shown in Table 2, a mean of 2.81 was obtained for the 80 patient

contacts, indicating that the doctors, as an over-all group, were moderately responsive to the needs of the mother and child for advice and reassurance regarding the physical and often the emotional aspects of the illness as well. Differences between the doctor categories are shown in Chart 3, which illustrates a tendency for the fellows to be significantly more giving of reassurance and support to the mother and child than the residents ($P = 0.001$) or the interns ($P = 0.001$).

Potential disturbance in communication.—The verbal and nonverbal interchange between doctor and patient was further analyzed for evidence of elements considered to be of potential disturbance to the mother and child. It should be pointed out, however, that on the whole the degree of potential disturbance relative to communication between the doctor and patient or between doctors was found to be minimal. In some instances, of course, it was not possible nor advisable for the doctor to avoid discussion of a disturbing nature. The giving of reality information regarding physical findings, recommended procedures, risks and alternatives of treatment, prognosis, or the existence of divergent medical opinion, although possibly upsetting to mother and child, was often essential to treatment.

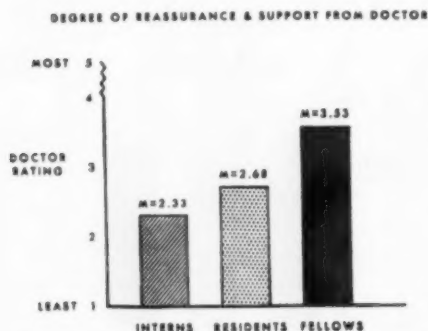


CHART 4.—Differences in mean degree of reassurance and support given children and their mothers by interns, residents, and fellows.

In a number of instances potentially disturbing comments were expressed by the doctor as seemingly deliberate stimuli in mobilizing the mothers to carry out their recommendations. Illustrative were such statements as "Strep is a dangerous bug," or "If the ear is not taken care of now hearing loss may result and your child may need a hearing aid or an operation."

There were a number of situations, however, in which potential disturbance to the child and mother resulting from the verbal interchange with the doctor seemed somewhat unnecessary and avoidable. One of these related to the use of technical language without explanation of the meaning. It cannot be assumed that words and phrases such as "residual damage," "neutrophils," or even "oral medication," all terms recorded in these observations, were interpreted properly by these patients, and lack of understanding of these words may have caused undue concern to mother and child.

The conveying of extraneous medical information of a frightening nature was also considered to be potentially disturbing to the patient. An example of this is shown in the comment of an intern seeing a child with proctitis, who, having informed the mother that the infection was probably viral in nature, added that viruses sometimes attack the brain. On another occasion this doctor lectured to a mother on the frequency of unnecessary surgery in mesenteric adenitis, her child's presumptive diagnosis.

The bestowing of unrealistic advice, another source of potential disturbance to child and mother, was exemplified by the doctor who prescribed a routine afternoon nap for a normal 10-year-old school boy, much to the consternation of both patient and mother.

Statements about the child made in his presence, or sometimes addressed

directly to him, were on occasion considered to be potentially disturbing to the child and therefore to the mother as well. An extreme example was set by one doctor who jokingly asked a child recovering from an intestinal upset if he wanted to have an operation. Another doctor asked a child with a speech disorder, "Don't you ever say anything but 'yes' or 'no'?"

Note was made of the occasional critical remark made by a doctor to a mother, often probably precipitated by her negligence, her over-anxiousness, or some aspect of her handling of the child which the doctor considered to be deleterious to the child's health. The doctor's disapproval was rarely stated directly or straightforwardly, but was more apt to be veiled or merely implied in his comments or tone of voice, for example, "Just for curiosity, why were you unable to keep the last appointment?" or "I agree with you that he is a spoiled brat."

The physician who reveals his own uneasiness and concern about a child's condition may arouse excessive anxiety in the patient and parent (6). Such comments as, "I can't find a reason for this cough," "These night sweats worry me," or "This is a difficult case to diagnose," give evidence of such feeling on the doctor's part.

Certain nonverbal aspects of the doctors' behavior were also thought to be possibly upsetting to the child and mother. One doctor silently and with deep concentration examined a child's heart without any subsequent explanation to the mother of his findings. Another doctor methodically filled twenty syringes for skin tests to be given a child whose apprehension increased perceptibly as she watched this preparation.

The teaching session in which a staff consultant checked over the examining doctor's history and physical examina-

TABLE 3
RESPONSIVENESS OF MOTHER IN ESTABLISHMENT OF A RELATIONSHIP WITH DOCTOR

	Per cent
1. Overtly hostile; or extremely impassive or inhibited.	4
2. Feelings restrained. Did not volunteer information. Manner tense, defensive, or flat.	10
3. Somewhat friendly, and more relaxed. Answered questions more readily, but not very active participation.	30
4. Pleasant, out-going, comfortable with doctor, talked freely. Encouraged child to participate in relationship with doctor.	51
5. Very friendly, quite cooperative. Displayed active interest, initiative, and willingness to help.	5
Total:	100
Mean = 3.39	

tion of the patient occasionally produced situations potentially upsetting to child and mother. Here again the use of technical language, or discussion between the doctors of the physical findings without explanation to the patient or mother, carried threatening implications. Some mothers tended, as was determined from later interviews with them, to put an unfavorable construct on these tête-à-têtes and to assume the worst. In addition, the consultant's quizzing of the trainee, gentle and restrained though it generally was, had potential for the undermining of the mother's confidence in her doctor's medical knowledge and ability.

Responsiveness of mother.—The rating of responsiveness of the mother in the establishment of a relationship with the examining doctor was based on an evaluation of the mother's manner, her participation, her expression of feelings, and the nature of her questions and comments to the doctor and also to the child. A 5-point scale was constructed for scoring of these attitudes, which ranged from overt hostility and extreme impassivity on one end to genuine friendliness and cooperativeness on the other, as shown in Table 3. When responses of the 80 mothers leading to this rating were categorized, a mean of 3.39 was obtained, characterizing our average mother as moderately friendly,

cooperative in a somewhat passive fashion, but lacking in much spontaneous expression of emotion either to the doctor or to the child. Real needs, expectations, and feeling tones were often unrevealed, a fact clearly evidenced in subsequent mother interviews. In the analysis of the relationships between the groups of doctors (Chart 5) a significantly greater responsiveness was evidenced by the mothers in the fellow group than by those in the resident ($P = 0.04$) or the intern groups ($P = 0.05$).

Responsiveness of child.—The rating of responsiveness of the child in establishment of a relationship with the doctor was based on an evaluation of attitudes and behavior similar to those assessed in the rating of the mother. Some of the children were extremely fearful, uncooperative, sullen, or hostile. Others were very friendly, receptive, and relaxed. When the responses of the children were categorized on a 5-point scale (Table 4) a mean of 2.95 was obtained, which indicated that as a group the children were cooperative and somewhat friendly but did not participate actively in the proceedings. That the children often concealed their true feelings, anxieties, and fears was evident from subsequent interviews and testing procedures in which the children sometimes directly described their feelings about the illness, the clinic, and the doctor,

TABLE 4
RESPONSIVENESS OF CHILD IN ESTABLISHMENT OF A RELATIONSHIP WITH DOCTOR

	Per cent
1. Overtly hostile; or sullen, impassive, or uncooperative.	4
2. Quite shy and unreceptive, or anxious and fearful. Did not volunteer information.	28
3. Somewhat friendly and cooperative, but not very active participation.	38
4. Quite friendly and relaxed, receptive to doctor. Talked freely.	30
5. Very active participation.	0
Total:	100
Mean = 2.95	

or, as was more often the case, revealed them in doll play fantasy. It is of interest that, unlike the mothers, there were no significant differences in the responsiveness of the children among the three categories of the doctors (Chart 5).

Relationship of doctor with mother and child.—Taking into account the individual contribution of the doctor, the mother, and the child, an over-all assessment was made of the level of relationship achieved, which on the average was moderately satisfactory. Although a trend toward greater responsiveness of the mother to the more experienced group of doctors had been noted, it is seen in Chart 5 that there was a much more marked group difference in the nature of the relationship the doctor was able to establish with the mother, with the fellows achieving significantly more satisfactory relationships than did the residents ($P = 0.005$) or the interns ($P = 0.001$).

In the consideration of the relationship established by the doctor and the child it is of interest that, despite close similarity of child responsiveness within the three doctor categories the fellow group here again was able to establish the most satisfactory relationships (Chart 5).

DISCUSSION

Differences in doctor categories.—The finding that doctors in training achieve progressively satisfactory levels of relationships with pediatric out-patients and their mothers may be attributable

to a number of factors. In the course of graduate education the physician presumably acquires, along with greater clinical experience and technical skills, progressively mature patterns of social and emotional response to patients. With the development of a sense of security regarding his basic knowledge the doctor is free to devote more thought to the psycho-social aspects of medicine. In addition, with sharpening of focus on a given field of medicine the physician may be expected to develop increased interest in various aspects of his chosen specialty, with consequent beneficial effects on patient relationships.

Personality characteristics of the medical graduate which affect his decision to seek education beyond the internship may in one way or another be reflected in his handling of patients; however, one can only speculate as to the direction these differences may take. Whether the young graduate who plans to enter the practice of medicine immediately after internship is more or less proficient in patient relationships than the one whose training will eventually include residency and even a fellowship is only a matter of conjecture.

The availability of time is another factor of possible influence on the doctor's success in establishing good patient relationships. Since, as these data showed, the observed group of fellows had the advantage of more time with the patients than did the residents or the interns, it follows that opportunities

for establishment of patient relationships, at least in regard to time, favored the fellow group.

The severity of physical illness is still another factor which can affect the doctor-patient relationship. Certainly more is at stake for the patient with a congenital heart defect than for the child with a mild upper respiratory infection. Since the mother of the seriously ill child is more dependent on the doctor than is the parent of the child whose health is not seriously threatened, she might well be expected to be more receptive to the physician and to participate with a greater eagerness. In addition, the physician's attitude may contribute toward a positive relationship, since he may be particularly concerned about the child with serious illness, or be intellectually challenged by the na-

ture of the condition. In this study half of the interns were observed in their handling of General Pediatric patients, who, because of the minimal nature of their illnesses, had been selected for purposes of comparison in the larger investigation with the handicapped children. On the other hand, two-thirds of the residents and all but one of the fellows were observed in contacts with the chronically ill children, so that the factor of severity of illness must be considered as contributing to the level of relationship achieved between doctor, patient, and mother.

The extent of continuity of contact with the patient undoubtedly affects the doctor-patient relationship. In this study, although no data were obtained regarding previous visits to the clinic doctor, it can be assumed that the children with

MOTHER & CHILD RELATIONSHIPS WITH DOCTORS

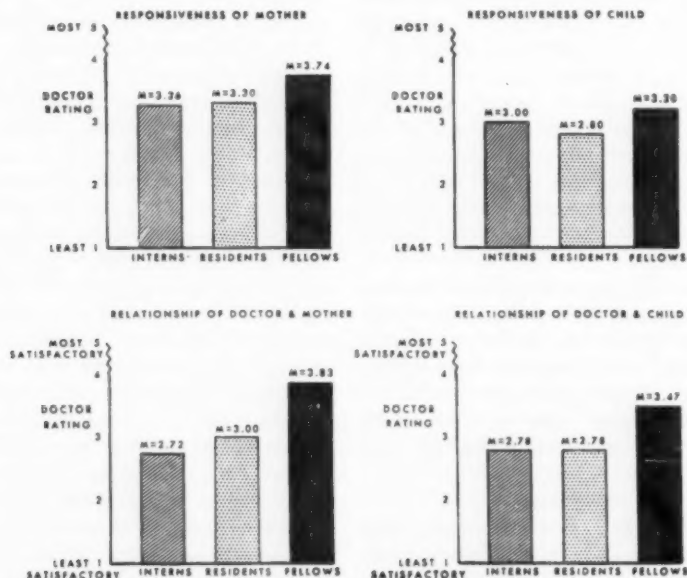


CHART 5.—A comparison of levels of responsiveness of mothers and children to doctors with levels of relationships achieved, showing mean differences between interns, residents, and fellows.

chronic illnesses were more likely to have had prior contacts with the same doctor than the children with short-term illnesses. It follows, therefore, that the fellows in all probability had more continuous contacts with patients than did the residents, who were likely to have had more repeated patient contacts than the interns. The implication is that more satisfactory relationships could then be achieved by the fellow group because of their opportunities for patient continuity.

Role of the out-patient department.—The out-patient department, in providing a setting wherein the doctor-in-training can gain better understanding of the problems of comprehensive medical care, serves an important educational role in present-day medical practice, which, partly because of recent advances in the management of acute infectious diseases, is becoming even more focused on the ambulatory patient. Moreover, in the pediatric out-patient department the preventive aspects of medical care, the psychological components of illness, and the role of family interrelationships, all factors of particular importance in ambulatory care, are demonstrated with especial clarity. It is essential, therefore, to recognize the value of effective out-patient experience for the medical graduate, with the expectation that a better level of medical care will consequently result.

SUMMARY

As part of a study of comprehensive medical care for handicapped children, observations of 80 doctor-patient contacts were analyzed in regard to factors in the relationship of pediatric patients and their mothers with fellows, residents, and interns. The significant findings were as follows:

1. The clinic setting in which this

study was carried out provided an adequate degree of privacy for the physician-in-training and his patient. Interruptions were minimal, and adequate time was set aside for the visit. Establishment by the physician of a suitable doctor-patient relationship was therefore not perceptibly hindered by the physical facilities, nor by the structuring of the patient contact.

2. Certain positive qualities of manner exhibited by the doctor in the establishment of rapport with mother and child were identified, with the fellows more consistently evidencing these traits and attitudes than the residents or the interns.

3. The doctor's communications with the mother and child, although involving more complexity in the fellow group, were nonetheless imparted with more clarity than were the less complex communications of the residents or interns.

4. In general the doctors were moderately responsive to the needs of the mother and child for reassurance and support, with the fellows exhibiting the highest level of this aspect of the relationship.

5. Evidence of elements of verbal and nonverbal communications of potential disturbance to mother and child was occasionally seen in the interchange between doctor and mother or between doctors.

6. The mothers, who on the whole were passively cooperative but not very expressive, were somewhat more responsive to establishment of a relationship with the fellows than with the residents or interns. The children, however, showed no significant differences in responsiveness to the three categories of doctors.

7. The over-all relationships of those 80 doctors-in-training with the mothers and children were on the whole mod-

erately satisfactory, with the fellows again achieving the highest levels of the group.

8. The differences noted between doctor categories in the establishment of patient relationships were thought possibly to be attributable to such factors as the physician's training, experience, and sharpening of focus as well as the availability of time, the severity of the patient's illness, and the extent of continuity of patient contact. The educational role of the out-patient department in the graduate education of physicians is emphasized.

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A Clinical View of Study Difficulties in a Group of Counseled Medical Students*

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In a recent publication (11), it was shown that medical students who differed greatly in their first-year academic performance in the Faculty of Medicine, McGill University, were similar in their intelligence and aptitude test scores; or, more specifically, that the performance of a group of students who sought psychiatric counseling was inferior to that of a control group of their peers in spite of comparable intellectual abilities as measured by the MCAT and WAIS. The conclusion was drawn that, in the I.Q. and aptitude ranges revealed by these groups, factors other than intellectual ones were operating in the determination of academic success.

Such factors should be capable of identification, description, and assessment within the framework of what Malleson (9) has described as "Operational Research in the University," an investigative approach aimed at eliciting the details of the interaction between the student and the university as they go through their course together. If poor academic performance is taken as one phenomenon to be investigated in this way, then we could isolate for study:

a) those difficulties with school work which arise primarily from problems

within the student himself and which we may call "intrinsic," and (b) those difficulties with school work which are the result of unfavorable environmental situations—that is, "reactive" problems. Clearly, such a separation would have to be somewhat arbitrary, since there are cases where students produce environmental difficulties by virtue of character-neurotic behavior, and, also, no external problem can be said to be without its intrapsychic repercussions. Nevertheless, for purposes of exposition, it is justifiable to divide study difficulties into those that are primarily reactive, on the one hand, and those that are primarily symptomatic or intrinsic on the other.

On the assumption that the ability to work might well be one of several functions impaired in students with emotional problems, the case material on 70 consecutive counseled students was reviewed. Of these 70, 43 revealed such difficulties either as incidental findings or as primary complaints. These 43 affected students were divided into two groups—those who were considered to suffer from reactive study problems and those with intrinsic study problems. Members of the latter group were in turn classified according to five categories which were clinically and psychodynamically distinguishable from each other. Although these categories accounted for all the intrinsic study difficulties that were observed, some students fell into more than one category.

1. Those students with negative or

* This investigation was supported by Dominion-Provincial Mental Health Grant (No. 604-5-77).

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uncertain motivation for the study and/or practice of medicine as a career or as a way of life.

2. Those students whose ability to learn certain parts of the medical curriculum is impaired for emotional reasons.

3. Those students whose difficulties lie in the process of studying itself rather than in what is being studied.

4. Those students with a significantly low I.Q. resulting in an inability to cope with either the general mass of work, or some aspects of it, in the time required.

5. Those students who neglect certain parts of the curriculum because of disinterest but who have no difficulty in preparing the neglected subject well enough to obtain a passing grade on examination.

This classification cuts across psychiatric diagnostic categories. It was adopted for two reasons. Firstly, it is notoriously difficult to establish firm diagnoses in late adolescence and early adulthood: the clinical picture can shift rapidly for better or for worse, making it hazardous to base prognoses with regard to academic performance on diagnostic grounds. Secondly, it is desirable to build up a dynamic understanding of the psychology of educational processes rather than to make procrustean efforts to fit the observed phenomena into traditional psychiatric nosologies. This classification has the advantage of being pertinent to the data.

INTRINSIC STUDY DIFFICULTIES

Motivational problems.—Those students who doubt their desire or ability to study or practice medicine comprised the largest single grouping. They can conveniently be divided into those who are doctors' sons and those who are not. In the Faculty of Medicine at McGill 16 per cent of all undergraduates have

physician fathers. In the total counseled group of 70, nearly the same percentage occurred in that twelve or 17 per cent were doctor's sons. Ten of these twelve students were judged to be suffering from motivational problems.

Typically, the story is that there had always been a tacit assumption within the family that the boy would follow in his father's footsteps and choose medicine as a career. Frequently, therefore, these students feel that they have not enjoyed the freedom to choose their own professions. Misgivings about studying medicine often precede enrollment into medical school and in some cases influence the choice of the school itself, since it is a matter of importance whether or not they should attend father's *alma mater*. Once in medical school the misgivings tend to become frank doubts or even aversions.

Such doubts are seldom based on mature or realistic considerations. It is common, for example, to find that these students (not unnaturally) see a medical career in terms of their father's life. As one sophomore said, "Every time I try to picture myself as a doctor, I see my father." Specialty choice is markedly influenced by a positive or negative identification with the father which leads the student to choose a specialty which may not appeal to him particularly and for which he may not be suited, rather than a specialty which captures his interest and for which he has some aptitude. Thus, the son of a urologist who, before his admission to medical school had had strong literary interests and whose best grades had always been in English literature, became anxious because he felt that he should study surgery, a specialty admired by his father but disliked by the boy. Actually, psychiatry was the subject which most aroused his enthusiasm, but unfortunately it was also that branch

of the profession that his father most disdained. Striking, too, is the fact that the social and financial rewards of practicing medicine, factors which are important in the avowed motivation of many medical students, tend to be needlessly discounted by doctors' sons.

Grumbling about the coercion to study medicine, however, actually serves as a rationalization by means of which many of these students attempt to avoid competition with their fathers. After some psychotherapy these students regularly talk of their fathers' long working hours, devotion to duty, ability to accept responsibility, etc., and openly doubt their own capacities to equal or better his accomplishments. Conversely, there is sometimes condemnation of the father which leads to a feeling of disloyalty in the son who feels he must do better, financially, ethically, scientifically, or personally; nor are these the only mechanisms involved. For instance, two students, both with markedly obsessional character traits, felt that in studying medicine they were ignominiously submitting to their fathers. Both students adopted a passive-aggressive attitude, making no more than necessary concessions, while stubbornly refusing to become seriously involved in their work.

One boy, while professing great admiration and love for a father whom he regarded as perfect by way of reaction-formation, withdrew from medical school entirely. Another male student was strongly identified with an artistic mother and resigned to study art.

Almost the entire group showed some inability to reconcile the public-professional image of the father with the private-paternal one. One result of this was an exaggerated cynicism with regard to their teachers and counselors. This cynicism, when coupled with a motivation for psychiatric treatment as dubious as their desire to become doc-

tors, resulted in a tendency to withdraw too readily from either psychotherapy or the medical school or both.

Students who are not doctors' sons but who are nevertheless, doubtful about a career in medicine are easier to help. Usually somewhat depressed, they doubt their own capacity for various reasons. One student felt guilty because he recognized his own insistent need to obtain love from his patients to leaven the fear of his responsibilities toward them. Another, the son of an artisan, having worked his own way through premedical school and much of medical school, became increasingly insecure as he approached his professional goal, feeling guilty and ashamed at having risen so far above his parents.

Specific inhibitions.—It is well recognized that excessive use of ego-defenses to ward off anxiety, instinctual impulses, or threatening external stimuli may result in restriction of the ego's adaptive functioning (6-8). Scant attention, however, has been paid to the limitations of ego-functioning so commonly encountered in medical students, although Erikson has consistently drawn attention to such problems in young people at large, characterizing them as symptoms of "identity diffusion" (2). These limitations manifest themselves partly in diminished adaptability, inflexibility, inhibition of skills, impaired learning efficiency, etc., which may in turn be manifested in the medical student population by such phenomena as difficulties in understanding, aversions to certain specialties or procedures, superstitions, prejudices, clinging to unfounded beliefs, etc. The following clinical examples will serve as illustrations:

A young woman in her preclinical years was unable, in spite of her best efforts, to retain the details of the physiology and anatomy of the female reproductive tract. She functioned very well

in other areas of learning. An hysterical personality type, she was unable to reconcile her curiosity about sex and reproduction with her guilt over competitive attitudes toward her unusually fecund mother and so repressed all conscious interest in sexual matters.

A male in his preclinical years suffered from a mild sexual perversion. In his school work he was unable to "understand" the anatomy of female genitalia, the study of which mobilized intense anxiety. It demonstrated the existence beyond doubt of castrated human beings (females), a fact which he had tried to deny.

Another male in his clinical years was so burdened with unconscious homosexual impulses which, however, were never acted out, that he suffered from sexual impotence. He related his impotence to symptoms which he diagnosed as due to a manic-depressive psychosis. As a result of this rationalization, he was unable to study psychiatry in spite of marked efforts, but was average in his other subjects.

Manifestly, not all aversions to specific subjects nor selective limitations of abilities take place on the basis of these mechanisms. In our material however, they occur frequently enough to merit consideration when an able student complains of the inability to grasp or retain some aspect of the curriculum, especially if this occurs in conjunction with increased study efforts in an attempt to overcome the handicap.

Difficulties with the process of studying.—Almost all medical students will complain of study difficulties. Episodic distractions (sports, girl friends, social events) leading to periods of poor concentration are common. These are transient, not incapacitating, and can be overcome by determined effort. There are students, however, who complain specifically of chronic and severe inability

to apply themselves to their books. In our series, such individuals fall into two groups:

a) Those in whom the process of studying becomes involved in obsessional symptomatology. In these students the procedure of sitting down at a desk to study is so bound up with ritualistic performances that little or no time is left for working. Thus, one student was compelled to disrupt his studying with timed raids on the refrigerator (the food was seldom wanted nor eaten), turning the radio off and on, etc. The meaning of these symptoms resolved itself into a covert defiance of his mother's oppressive ambitions for him. Another student, whose unconscious purpose it was to avoid masturbating, would determine as he sat down alone to work that he would not underline his text-book. After a half an hour or so he would be compelled to start underlining, and, commencing deliberately to underline important points in the text, he would increase these emphatic measures in tempo and frequency until he was underlining every line of every paragraph. A third student read aloud from his book into a tape-recorder, then made notes from the tape-recorder onto sheets of colored paper using a most complicated convention to govern this procedure.

b) The other group of cases are those who, in effect, day-dream, consciously or unconsciously, about sex in the peaceful hours when they should be studying. Here the difficulty is not related to a specific topic as in category 2. For example, it took several sessions of psychotherapy with one female patient before she was conscious that during the "blank" periods which occurred frequently during studying, she was fantasizing about holding a baby in her arms.

Significantly low I.Q.—In our material, there were only three cases whose I.Q.'s were inadequate for the task that

they had set themselves. Such cases are best detected by consulting their MCAT or WAIS scores; their academic records alone are not enough, since some students with higher I.Q.'s have academic records that are comparable. These students themselves usually do not know what their difficulty is, although they may inadvertently give the interviewer a hint. One man who had written numerous supplemental examinations (he was invariably successful on his second try) said he was always surprised to find how much work one had to do to make a passing grade. In our very limited series these students were not necessarily neurotic, although certain compensatory maneuvers occurred which were designed to alleviate or mask their difficulties, e.g., making a hobby of collecting eponyms, or making the most of a language difficulty.

Disinterest in certain subjects.—Certain students simply neglect some subjects. Their performance tends to be uneven, therefore, in spite of adequate intellectual ability. At first glance they are difficult to differentiate from those students in category 2, because the distinction between these categories is primarily a psychodynamic one. In this group there seems to be a reduced cathexis of some topic rather than a counter-cathexis brought to bear against it for defensive purposes. As a result of this, they do not complain of difficulty in mastering the subject but rather of not liking it. Thus, the student with a practical and concrete turn of mind, who preferred the science to the art of medicine, had no interest in clinical psychiatry, but experienced no difficulty in obtaining a passing grade in the examination.

REACTIVE DIFFICULTIES

These are the study problems with which the administrator is most famil-

iar. They include reactions to all manner of unfavorable situations, e.g., financial difficulties, marital problems, sexual problems, physical illness, death in the family, etc. Theoretically, they may include any stress to which a student may be accidentally exposed. In some cases in our series, it was a matter of some difficulty to decide whether the circumstances from which a student was suffering were self-induced or accidental. There was, furthermore, a group of students, such as those described by Davy (1), who only saw their difficulties as existing outside themselves. These students pose more of a problem for treatment than for classification, since it is clear that in spite of their protestations they do not belong in the reactive category. In our experience, they tend to be chronic complainers and seldom come of their own accord to the counseling service.

IMPLICATIONS FOR FURTHER WORK

It has already been established that our counseled group performed less well than a representative noncounseled group of their peers, in spite of comparable intellectual abilities. The foregoing clinical material indicates at least some of the ways in which their standard of workmanship was impaired.

It should not be assumed, however, that the medical students who seek counseling are strictly comparable to, say, the population that attends a psychiatric out-patient department. As a group they differ in many important respects.

First, they are all above average intelligence. Second, with few exceptions, they are highly motivated, young, adaptable, and physically healthy. Third, they are capable of functioning in a relatively effective manner, although, in some instances, this is accomplished at high cost to themselves.

The counseled group, therefore, oc-

cupies a position in between those patients who are severely handicapped by emotional disturbance, and those who are functioning efficiently, as for example, the remainder of the student body. This is important because some observers (e.g., ten) have reported that academically successful medical students show more manifest anxiety than do their failing brothers. However, it is rare even in the counseled group for anxiety to reach incapacitating levels. In addition, there is very probably a correlation between "motivation" and anxiety in that students who are keen to succeed are more likely to cathect the idea of success, and strive hard for it, than are students who are doubtful that success in medical school is what they really want, as in our category 1. It is a clinical fact that, in the latter group, failure may be desired as a solution to their problems. Also, in category 2, in students with specific inhibitions, psychotherapeutic intervention often released anxiety as the defense mechanisms were undone, but it also rendered the student able to learn more efficiently.

It is a matter of some interest, also, whether psychiatric counseling can raise the level of performance in students such as the counseled ones. Our clinical impression at the present time is that in many instances it definitely does so, and an analysis of the results of psychiatric counseling is planned, for each category of study difficulty in the above classification.

Another question is whether there are factors peculiar to undergraduate medical training (as opposed to training in other professions), which are apt to produce particular emotional problems. In general terms, it seems clear that students must be highly motivated if they are to be prepared to stand the gaff of medical training. Difficulties ensue when such motivation is doubtful

(category 1). We are impressed, for example, by the frequency with which emotional problems in medical school appear to be related to the reasons for which a particular student may have chosen to study medicine. To illustrate: a young man in his clinical years became depressed when he was forced to recognize the limitations of the treatment available for many of the pathological entities he encountered on the wards. He had been severely hypochondriacal for most of his life. In studying medicine he had hoped to obtain reassurance against his fears and share in the omnipotence with which he had endowed doctors.

In general, we share the opinion of Whitehorn *et al.* (12) that medical students, more than others, come into daily contact with situations that are particularly likely to engender or revive emotional conflict. These involve birth, death, disease, and the human body, not to mention a wide range of interpersonal relationships which are all but unique to the practice of medicine—e.g. examining a dying patient, etc. In a relatively short span of time, the medical student must try to exchange the magical, moralistic, and emotional attitudes of the layman for the informed scientific and impersonal but humane attitudes of the modern medical practitioner. Workers in both the psychological and sociological fields have already contributed observations on the changes in attitude brought about by medical training that fall within the normal range. Thus, for example, Eron (3, 4), followed by Miller and Erwin (10), using psychological test techniques, have investigated the relationships between stage of training, manifest anxiety, and "cynicism." Their contradictory findings emphasize the point made above in connection with academic success and anxiety—that more flexible research tools are needed in an

area where so many variables are involved. Among the sociologists, Renée Fox (5) has shown that cynicism, wit, laughter, taking bets, unusually strong group ties, etc., were common characteristics of a team of postgraduate research doctors who were investigating and treating incurable metabolic illness. She ascribed to these attitudes a defensive function against underlying feelings of guilt, uncertainty, and helplessness. Observations such as these are germane to an understanding of the ubiquitous, gradual, group-condoned attitudes that are adopted by students in coping with the emotional stresses of their work. Little is known, as yet, however, about the manner in which such defensive attitudes are developed and maintained in individual students, or the degree to which these mechanisms actually affect working efficiency. Conversely, little is known specifically about the factors which contribute to an individual student's failure to adapt to the demands of the medical school setting. Presumably, in addition to the necessary technical knowledge and skills, during their training students must eventually acquire such attitudes, values and philosophies as will permit the fullest possible exercise of their professional functions—a state, as it were, of true professionalism. The clinical method by studying adaptational failure and its correction is in an advantageous position to contribute to an understanding of these processes.

In summary, several types of study difficulty encountered in medical students have been described along with some of the factors underlying them. It has been suggested that a clinical approach is necessary, as a first step, for the identification and understanding of factors which either foster or undermine the adaptation of students to work in medical school. In the work, the student

who attempts to do it, and the way he evolves for doing it, lie a wealth of material for clinical investigation. Such study would provide valuable data in the formulation of selection and teaching procedures.

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Concerning Medical Thought and Medical Education

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If self-criticism and a seeming desire to constantly improve is a healthy sign in a group, then medical teaching is in a robust state. From many medical teaching centers we hear a great deal of talk and discussion about changes they want to make in their curricula, in an effort to graduate doctors who will have a more comprehensive view of the sick patient and how to treat him better. Since the emphasis has been and still is on the teaching of the physical sciences and how these can best be used to understand man's ills and treat them, it would appear that to make medical teaching fuller some of the emphasis will have to shift to other fields of thought relating to man. This desire to give students a more comprehensive insight into medicine implies that what has been taught is too restricted in scope. Presumably, it has been observed that there are too many unmet demands made on the present-day medical practitioner.

In the past when the practitioner had very little with which to treat the sick man he had to make use of everything at his disposal. Often all he could offer was no more than support and comfort. Yet this could suffice if it was given with understanding. To arrive at this understanding the practitioner had first to visualize his patient as an individual who needed help.

Today the situation is changed. The practitioner has never been better equipped technically to treat man's physical ills. Yet with all this it appears that he still fails to help the sick man in many instances. The practitioner has

developed a better understanding of the ills of mankind but has lost sight of some of the needs of the sick man as an individual. Medical thought must make an effort to gain this insight and then learn how to teach the practitioner to understand and use it. This is an important point. No matter how well the individual patient's physical ills are treated by the ever-expanding number of specialties and disciplines within the medical profession the individual still will have other needs that have to be understood and fulfilled if possible.

There is no doubt that, as a result of scientific progress, man's lot is a healthier one. This application of scientific knowledge to man has been done by the various medical disciplines, but without any all-encompassing idea or philosophy relating to the central figure—man, the organism, as he functions in his environment. It is possible that if medical thought evolved such a philosophy a better understanding of man the individual and his needs might follow.

At present there is little effort made to teach any such concept or philosophy to the undergraduate. In fact, present-day teaching tends to militate against this. By the time the young doctor has graduated from medical school he has learned a great many facts, some of which he can prove and others he has to accept on faith. He has been taught by many people on the teaching faculty of the school. There has usually been very little attempt by these teachers to integrate the data for him. There has been repetition, overlapping, and even disagreement of the material taught. For greater ease of teaching and understand-

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ing, each quantum of data taught the undergraduate has been classified and has been presented as a unit which often appeared to be isolated from other facts or ideas taught him. At no time in his medical studies has the student been given any broad pattern or philosophy on which he can organize the data and thus be able to think of it as a whole. Instead, his mind has to constantly juggle the data in this fragmentary form, now using this and now wondering about that. Occasionally, the thinking individual will take some of these bits and create a larger idea or what may even be the beginning of a philosophy. The number who are able to do this is few.

Of all the various departments in the medical faculties the psychiatric departments are the ones most interested in this problem. Good attempts are being made to introduce into the curricula teaching material from the social sciences which tend to give some unifying quality to medical study. This increased emphasis on the teaching of these social sciences—psychology, sociology, anthropology, ecology, is good. As it goes on and increases it may give some students, at least, some insight into the study of man as he is—something more than a machine whose activities are governed by more than just physical laws. However, even this improved plan will have the same drawbacks as there are in the teaching of the physical sciences. The data will of necessity be taught by the members of the various disciplines involved, each with a different point of view. Because of this the pattern of wholes which goes to make up man as he functions in his environment will still be more distorted than it need be in the mind of the student. To increase comprehension in the mind of the student we must aim for greater integration of material taught.

It is the purpose of the paper to try

to show how the medical curriculum can be better integrated. In this way the material taught will be more readily seen to be a whole, relating as it all does to man, the biological organism, as he functions in his environment. It is planned to do this by discussing a number of ideas. The points to be discussed are.

1. Holism in medical thought.
2. Ideas from Darwin's descent of man and their relation to medical thought.
3. The biological concept of ecology as it relates to man.
4. The historical sense in medical thought.
5. A discussion of how this material can more readily become available for teaching.

Holism.—Man does not know much about nature's laws, and his pygmy attempts to restrain nature's behavior by man-made laws and formulae are futile. The universe is a whole. It is made up of many lesser wholes which relate to one another. Since man can never have the ability to comprehend the significance of the universe and how it is constructed we can never have the knowledge to prove this. We have to accept this on faith. However, when lesser fields of knowledge relating to the world are studied it is possible to see that there is this unifying whole-making force in our midst. Therefore, it follows that, when knowledge taught is broken up into isolated segments and scraps, and the student is not shown that this knowledge must be constantly related to other ideas, then it is a most unrealistic state of affairs. This concept of holism has been well expressed in a book, by Smuts, published in 1926, *Holism and Evolution*. In it Smuts discusses what I have said above in a most interesting way. The book is out of print and not readily available. For this reason I will give

two pertinent, if rather lengthy quotations from it. "This work deals with some of the problems which fall within the debatable borderland between Science and Philosophy. It is a book neither of Science nor of Philosophy, but of some points of contact between the two. To my mind it is the surface of contact between the two that will prove fruitful and creative for future progress in both, and to which special attention should be directed. Some border problems between the two are here considered in the light of recent advances in physical and biological science. And a reexamination of fundamental concepts in the light of these advances reveals the existence of a hitherto neglected factor or principle of a very important character. This factor, called Holism in the sequel, underlies the synthetic tendency in the universe, and is the principle which makes for the origin and progress of wholes in the universe. An attempt is made to show that this whole-making or holistic tendency is fundamental in nature, that it has a well-marked ascertainable character, and that Evolution is nothing but the gradual development and stratification of progressive series of wholes, stretching from the inorganic beginnings to the highest levels of spiritual creation . . ." (5)

" . . . We have to return to the fluidity and plasticity of nature and experience in order to find the concepts of reality. When we do this we find that round every luminous point in experience there is a gradual shading off into haziness and obscurity. A "concept" is not merely its clear luminous centre, but embraces a surrounding sphere of meaning or influence of smaller or larger dimensions, in which the luminosity tails off and grows fainter until it disappears. Similarly a 'thing' is not merely that which presents itself as such in clearest definite outline, but this central area is

surrounded by a zone of intuitions and influences which shades off into the region of the indefinite. The hard contours of our ordinary conceptional system do not apply to reality and make reality inexplicable, not only in the case of causation, but in all cases of relations between things, qualities, and ideas. Conceive of a cause as a centre with a zone of activity or influence surrounding it and shading gradually off into indefiniteness. Next conceive of an effect as similarly surrounded. It is easy in that way to understand their interaction, and to see that cause and effect are interlocked, and embrace and influence each other through the interpenetration of their two fields . . ." (5)

For ease of teaching and learning, data have to be organized into classifications. Let us suppose that the matter to be discussed is a "large" idea. It is a whole made up of a central core or area with a field of influence about it which relates in turn to other wholes. The "large" whole is, of course, made up of lesser parts or wholes. These each have their own lesser central areas or cores with fields of influence which relate to one another. In order to make a classification the teacher has to condense the data so that he can more readily pass it on to the students. To do this he had to sacrifice the relating pathways—the fields of influence from each of the central cores of the lesser wholes—and he produces a more compact whole. Unfortunately this has also tended to remove the field of influence from around the original "large" idea or whole, and it cannot relate very well to other "large" wholes with which it did previously; it therefore tends to stand as an isolated fact. In this condition it is sterile and cannot create ideas. For this reason the student, in addition to being given condensed data, should be constantly reminded and shown how

he can restore to any datum its field of influence. Few undergraduate students can do this effectively for themselves.

In this connection there are several ideas and concepts (allergy, psychosomatic medicine, wisdom of the body or homeostasis, stress concept, inborn errors of metabolism, the various fragments of psychiatric thought) which we accept in medical thought and teaching, which when considered holistically can be shown to be the hard central cores or areas of larger ideas, but in the main their surrounding fields of influence are missing. It should not be difficult to teach medicine with holistic philosophy as a background. Medical thought, medical teaching, and medical practice relate to one large whole. It is—man, the biological organism as he functions within his environment.

The descent of man.—If we want to understand man when he is ill we must have as much data as possible to show us in what ways man can be ill. There are two areas which are seldom thoroughly considered in relation to man's illnesses. The first is about man the individual and how he is constructed. The second is man's environment. Medical thought in relation to man's illnesses always more or less states or implies that man, the individual, is built along similar lines to all other men and that he is always able to find reasonable comfort in the environment the human race has built for itself and has elected to live in. This is erroneous. Man's environment is in time and space. The idea of space is readily accepted. Self-centered man less readily accepts the idea that time is part of his environment. Yet, man is what he is because of whence he came. There is inherent, in Darwin's teaching of the descent of man, a facet in relation to medical thought which is very important and

should be more apparent to medical thinking than it appears to be. Because man descended from lower forms he is of necessity completely made up of parts inherited from these lower forms. Although man has adapted and modified these parts, to his own use, there may remain in these parts an inherent anamnesis in the cellular and humoral structure which may prevent these parts from integrating and functioning well in their new setting. We can think of a part which functioned well long ago in one setting which may have functioned less well when called upon to work in another organism later in a changed way. This may have been the beginning of a prototype of a new part which works poorly in many settings later still. Thus, various ill functioning parts or combinations of these parts may turn up in any individual and further continue to do so in his descendants. Man's poorly controlled mating habits in the past and present (and not likely to change in the near future) from which stems man's reproductive pattern, have produced an ever increasing pool of these ancient potentially ill functioning parts in the population.

Each individual is a unique organism. Some are well integrated, and they function as well or better than the hypothetical norm. Others function less well than this. Each individual responds in his own way to illness and its treatment. Medical thought does not ignore this altogether, but it is considered in a negative way as an abnormal response or idiosyncrasy. If we thought about this holistically we would consider it as within the unknown potential of the general pattern of response and would say that we do not understand it at present rather than label it abnormal. If we consider responses to illnesses or treatment in a holistic way we would be less impressed by every newly dis-

covered syndrome of "inborn error of metabolism." For every one of these that is being discovered there are many ill people whose unwellness is of this order but not well understood—poorly integrated individuals who are being asked to live in environments which do not suit their make-up. As the race continues and more refined laboratory methods are evolved, these people will be studied more carefully, and many more syndromes will be discovered. One could go so far as to imagine that for every enzyme system there can be an individual or individuals with some variant or variants of unenzyme system (with apologies to Lewis Carroll). The number of these abnormal enzyme systems can be legion. Man is still in an evolutionary state of flux. Williams has recently brought together some very important data which stress individual man's uniqueness (6). This aspect of the study of man should be considered within the scope of undergraduate teaching of genetics. However, in the data taught to the undergraduate, which stress the unusual development and mode of inheritance of the more dramatic and uncommon genetic factors, the previously discussed factors in man's illnesses are largely ignored. Because of this, it would seem that the general feeling by contrast is that the average more acceptable "normal" man is a static entity and that man is no longer evolving. Moreover, it is suggested that the majority of men are well integrated and that all their parts function well together. The practice of medicine does not bear this out. Few people are so well integrated that they readily fit in with their environment. Therefore, one can only say that the material taught relating to the inheritance of unusual genes is interesting and does illustrate the modes of inheritance. It is, however, only a fragment of the whole body of

thought. If we are to have a better idea as to the cause of man's illnesses, the medical thought relating to genetics must make an effort to encompass one of the whole ideas inherent in the study of genetics—that is, that man is made up of parts which often integrate poorly. It is rather ironical that many engaged in medical teaching think only of chromosomes and genes when Darwin's theory is mentioned, yet Darwin did not know about chromosomes and genes.

Ecology.—Above it has been stated than man's environment is in space and time. Actually, for the sake of brevity I have ignored man's mental and spiritual environment. Let us now look at the space element of man's environment. This study in biology is called ecology. The study of ecology says that a species of organism living and well and multiplying has obviously found that environment favorable. It may not have always been so. The species in question may have passed through a great deal of change to have arrived in its present satisfactory state. This same species may not thrive at all well if it should be moved to a different but less favorable environment, because it cannot change the environment.

The environment that man, the group, has built does not suit all individuals. It is generally stated that man of all biological organisms is the only one which can change its environment. This is only a partial truth. The environment which man, the group, has built up may be changed by the group. Man, the individual, cannot change it. He may modify his own immediate personal environment somewhat but can do very little about larger changes if the larger environment does not suit him and he does not thrive in it. When we as doctors speak about such an individual who is not thriving in his environment we usually do so from a negative point of view. We

say that the individual is allergic or neurotic or psychosomatic or psychotic or whatever, depending on the discipline of medical thought we are applying. If we thought about such an individual in a positive way, holistically, we would say that this individual is being asked to live in an environment in which he cannot thrive. The individual is unique and should be thought of in this way. The writing of at least one psychoanalyst accepts the schizophrenic as an individual fit to live in society, if without injury to his neighbors he can find his own sources of satisfaction and security. He should not necessarily be expected to make a conventional adjustment to his environment (4).

The various disciplines and concepts and classifications which are part of medical thought almost appear to be built upon the basis that all men are and act alike in their environments. In fact, it would appear that the environment in medical thought is not considered to be very important. When it is discussed at all in relation to man it is usually phrased "man and his environment." It is, as it were, some appendage tacked on to man, the organism. It is not so. Man is *in* his environment always and functions within it.

Historical sense.—Three ideas have been discussed above which should be more actively incorporated in medical teaching. To these can be added another aspect which would bring a cohesive quality to what is being taught. Holistic thought in medical teaching has with it a historical sense which tends to be lacking in medical teaching. The facts taught are usually dispensed by people quite well versed in their own field of study but who usually lack the ability or disregard the knowledge of how and when the data they are teaching, arose. Doctors, too often, disregard the importance of the necessary awareness of the

fundamental growth of knowledge in their work. Lawyers, of necessity, are more aware of this historical background of the knowledge in their discipline. Because of this lack, doctors are all too ready to accept all the new discoveries that constantly assail them. They seldom can do otherwise when they have no background against which to measure the new facts. With the usual medical data the how and the when this knowledge arose should be taught. The data and the history should be so interwoven as to make a meaningful pattern. It is intriguing to think how stimulating such a teaching format could be to some students. The imaginative ones, hearing about the historical background against which the data they are being taught arose, might think of themselves as having done the work in question. Certainly these students will better understand what they have been taught. Conant has described how successful this method of teaching can be (3). The present-day criticism of teaching in the grade schools is that methodology is overstressed and content of material taught is considered to be less important. In medical school teaching methodology is largely ignored. What has been said above may be said to be in the realm of methodology. This discussion suggests the need of some rearrangement of the curriculum so as to incorporate with the medical data taught a frame of reference against which the student can think about what he has been taught by the various specialist departments. How can this be done?

Center for training medical-school teachers.—The best method of teaching has yet to be discovered, and the suggestions made below should not be too readily dismissed because they are unusual. In the past when the amount of knowledge extant was small, the people needed to teach this material were few.

This gave an integrated quality to the curriculum. The amount of knowledge was small enough that it could be viewed as a whole against a philosophical background of thought. With the amount of knowledge extant today there have to be many teachers in the faculty, each a specialist in his field. To help the data taught, this material has to be more integrated. It may be possible to integrate these data better by having the various specialist teachers integrate their ideas and material more effectively with one another. With a great deal of supervision by the heads of departments this might be some improvement. However, this is not practical and would cause a great deal of friction and irritation in the faculty. We can borrow the pattern of thought from the past when a few people were able to teach all the data known. We can do this in a modified way today. There are in medical schools today a few people who have a good medical knowledge, a good sense of history, and can think holistically. Such holistic thinking can unite the various concepts and specialties which make up medical thought by disregarding the walls which surround these concepts and specialties. These people can give a course of teaching throughout the medical course and "interpret" holistically for the students the factual data which they receive from the various specialty departments. The number of such people available, however, in the country is really insufficient, and others would have to be trained to teach in the holistic way. To achieve this a special center or institute would have to be started. Here well qualified faculty members from various medical schools could come to learn how to think and teach holistically. History, especially medical history, philosophy, anthropology, and the various social and behavioral sciences could be related to medical data and the resulting mass of

knowledge made into a realistic and stimulating whole. Later these teachers could in their own medical school "interpret" the specialist-taught curriculum to the students in a realistic and scientific way. This institute may benefit medical thought in another way. It can become a center for the synthesis of medical knowledge. The amount of knowledge relating to medical thought increases daily. Much of it cannot be used, because we do not know what to do with it. In this center where the thinking will be holistic there will be a greater opportunity to think of this free-floating data in a synthetic way.

That there is not enough time available to add all this to the present medical curricula will be the obvious response to what has been said above. Since the medical schools in general are not satisfied with what they are doing there will be changes made in the future. The changes suggested above can readily be fitted in if some of the material now taught is deleted. The practice of medicine is an art and not a science. It is important that the student learn to carefully assess his patients' complaint and then assess his response to treatment. This is best done by learning the rudiments of the scientific method of thought. In addition, the medical student has to learn scientific data gleaned from the various scientific disciplines which he will use. The undergraduate has to become familiar with the simpler laboratory techniques for two reasons: He first has to get some insight into the structure of the body by the study of histology, physiology, and biochemistry. Second, he has to learn to do some of the laboratory work in his study of the patient. All this will not make him a scientist. His work in the future will be to study an ill human being so that he will be able to understand him and be in a better

position to help him. It is not possible to ever calculate all the variables that make up a human being in wellness and illness and arrive at a series of formulae which may be analyzed and studied as one can do with data gleaned from an experiment in the laboratory.

With the growth of the importance of the laboratory in the more refined study of disease processes, the undergraduate's time is taken up with learning of more and more esoteric laboratory techniques. This is unnecessary and wasteful. Study of this type is the work of the people working in this field. These are not "anti-scientific thoughts." Science can flower and flourish in the right place. When science brings to fruition something of value for the doctor in practice, it will not be withheld. Actually, medical discoveries are too often publicized before they are ready.

There is another area in which the undergraduate's time is taken up too much. The importance of some clinical work taught is overstressed out of all proportion to how often the young doctor will meet such work in the early years of his practice. Atlee has recently discussed this in a paper in which he looked at the future of medicine (1).

The time saved by decreasing the work done in the above-mentioned spheres, plus a little more planning toward a better integrated curriculum with less overlapping and duplication of data taught, will give more time in which to teach the undergraduate a broad philosophical approach in relation to man. There must be this drawing together (especially at the teaching level) of all the splintered fragments that go to make up medical thought if the doctor of the future is to help the sick man of the future. One might go further and say that this must happen if we are to preserve the concept of the doctor-practitioner as we know him.

This paper may appear to be somewhat indefinite, and it may be said that it does not directly name and face the current problem of medical teaching. That there is some validity in this criticism, there is no doubt. However, it is also obvious that the problem is too big to do more than this paper does, since it is only an introductory discussion to the problem. To implement the changes suggested by this paper will necessitate the working out of many details. Early in the paper it is suggested that some concepts (allergy, psychosomatic medicine, homeostasis, stress concept, inborn errors of metabolism, and the various facets of psychiatry) would profit medical thought and medical teaching if these were viewed more holistically. These have been considered in some detail by the author, but only one short paper has been published (2). In addition, there is in the literature today a great deal of holistic writing in relation to medical thought which can be brought together and become the framework for the preparation of material which can be used as guidance by those who may start this program of changes in the future.

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Contrasts between Several Means of Appraising Physicians

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The measurement of quality of medical care by quantitative means has been generally considered to be a desirable goal but one fraught with numerous problems, some of which are perhaps incapable of solution. The present investigation was designed to study a limited aspect of such measurement within one hospital including the interrelationships and reliability of estimates for (a) supervisors' rankings of competency of residents, (b) nurses' ratings of residents' ward performance, (c) patients' evaluations of physicians as measured by a questionnaire, and (d) variations in patient care as rated from hospital charts.¹

Supervising physicians could be assumed to be a valid source for judgments about the competency of the residents whom they supervise if independent rankings from such judges have sufficiently high reliability. As an added check on reliability the evaluations of ward charge nurses could be obtained.

Competency might be presumed to be an important factor in the quality of medical care. It has been stated, "In the

last analysis the quality of medical care depends primarily on two factors—first, the quality of medical personnel, and, second, the procedure and facilities through which the latter render service. Without professional competence of the individual worker, the best of institutions or facilities may be more of a menace than a benefit" (6).

The present study did not deal with the problem of absolute standards of competency or with interhospital comparisons. A study which did consider such problems was reported by the VA Committee on Measurement of Quality of Medical Care (3). In that study, 21 physicians-in-residence from urban centers were given remote assignments in outlying hospitals with the hope that the contrast in settings would stimulate thinking about possible methods for evaluating quality of care. Most of the physicians were reported to have based their judgments of the quality of care on the assessment of the capacity and effectiveness of key personnel such as the chiefs of hospital services. The physicians-in-residence lacked objective measurement criteria and were forced, according to the report, to use personal judgment, such as the comparison of handling of similar patients by better-known doctors in better-known hospitals of their past experience. An observation by this group which is particularly pertinent to the present study was the comment with regard to the value of pa-

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¹ Copies of the patient questionnaire, nurse rating forms, and chart rating forms are available from the authors.

tients' opinions—namely, that it would be an error to accept patient happiness as an indication of quality of care. Peterson *et al.* (7) also reflected this attitude when they pointed out that "It is part of folklore that a layman values a physician's personality or 'bedside manner' more highly than his professional knowledge which may be less tangible or evident." In that carefully designed study the authors found that there was no linear correlation between the quality of medical care provided by a physician and his net income. It would be predicted from these statements that patient evaluations might not show a high degree of relationship to measures which could be presumed to provide valid estimates of competence. To test this assertion a questionnaire was developed to permit patients to evaluate their physicians and their general hospital treatment.

In a study also reported by the VA Committee (3), it was pointed out that masses of statistics cannot be substituted for professional judgment based on actual observation of a program. The committee commented on the variety of investigations which attempted to evaluate quality of medical care by the study of medical records and noted that usually such studies in reality are more concerned with the improvement of medical care and the education of staff than with the determination of quality. The committee was critical of such studies, because they evaluate care in retrospect and also because they are only an indirect means of obtaining judgments of quality of care (although the committee noted that they can be an effective means of improving medical records). In discussing a study by the Health Insurance Plan of Greater New York in which outside specialists reviewed clinical records of patients treated under the plan, the VA Commit-

tee stated, "Obviously, such a method for evaluation is dependent on the judgment of the reviewing physician who had not directly observed patient care and did not evaluate the physician-patient relationship." The most recent report by the Committee for the Study of Hospital Standards in Medicine of the American College of Physicians (4) concluded in part that: (a) there are presently no simple objective criteria for judging quality of medical care, (b) by systematic, critical review of records of hospitalized patients competent clinicians can render reasonably satisfactory judgments, (c) quality of care received by patients must be assessed, not quality of record-keeping, although the latter is indispensable, and (d) an appraisal committee of the hospital's own staff can best evaluate quality.

PROCEDURE

Questionnaire.—The patient attitude questionnaire was constructed by the following steps. A large pool of items was tried out on medical patients who were referred to Psychology for screening. For each of the items the patient checked one of the four alternatives: False, Sometimes True, True, or Very True. A typical item was, "I could usually see my doctor when I needed to." At the end of the questionnaire the patient was asked to make a global overall rating of his care as Good, Very Good, Outstanding, or Excellent. The relationship of the patients' responses to each item and their global rating, which was the criterion, was then calculated. Those items which discriminated Good or Very Good vs. Outstanding or Excellent global ratings at a better than chance level were retained. Added to this internally consistent pool were items which had previously been validated in the Iowa Nurse Utilization Project (1) and the Boyle Patient Needs

Study (2). The questionnaire at this stage contained 77 items. This questionnaire then was taken to medical wards and administered to all patients who, in the opinion of the nurses, were able to cooperate. Questionnaires were considered invalid if all of the responses were at one extreme or the other, indicating that choices had been made indiscriminately on the basis of their position. Of 100 valid tests which were obtained, 72 were arbitrarily categorized as *Positive* in terms of the patient's global rating of *Outstanding* or *Excellent* and 28 as *Not Positive* in terms of the patient's global rating of *Good* or *Very Good*. Items were analyzed against the criterion, and the items showing a significant difference were retained. The test was then administered once more to 94 patients on the medical wards. Sixty-four were *Positive*, and 30 were *Not Positive*. Another item analysis was performed to find items that differentiated between the two groups at a level better than chance. The results of these latter two administrations were then analyzed by the double-cross validation technique (5) which yielded 56 questionnaire items that discriminated significantly between the total group of patients in the *Positive* and *Not Positive* categories. In addition, three items were retained which referred to overall ratings of: (a) the hospital, (b) the nurse, and (c) the management of case. These items also differed significantly between the two categories of patients.

In the final set of items, 28 referred to physician characteristics. A very high correlation ($r = .94$) between scores on these items and the total score indicated that either one might be substituted for the other. However, inspection of other aspects of the questionnaire and appended comments by the patients indicated that the more personal aspect of the patient-doctor relationship might

be better judged from the two items, "I wish I could have my doctor for my private physician," and "My doctor is the kind of man with whom I would like to go fishing (or hunting, or golfing or some other sport)." These items will be referred to as the *Selected Items*. Patients will be classified as being *Favorable* or *Not Favorable* toward their physician on the basis of these two responses.

Supervisors' ratings.—The Chief and Assistant Chief of Medicine independently ranked their 29 first-year residents according to their judgment of the ability of the residents. These residents were a homogeneous group ranging in age from 26 to 40, with a mean age of 29. They were highly selected, with most of them having ranked in the upper third of their medical school classes. There was a high correlation ($r = .72$ $P = <.01$) between the two sets of rankings, indicating high reliability in the judgments, despite the narrow range of the sample. Residents ranked in the upper half of the distribution will be designated *High Ranked* and those in the lower half *Low Ranked*.

Nurses' ratings.—A rating questionnaire was completed by the charge nurse on the physician's ward. This form consisted of eleven items rated on a four point scale from *False* to *Very True*. A typical item was "This physician is sympathetic to his patients and their illness." Scores for each item were weighted from 1 to 4, and the total score represented the sums of these weights. The resident physicians were then ranked on the basis of these scores. There was a high degree of consistency between the nurses' rankings and those of the two supervisors in terms of Kendall's Coefficient of Concordance ($W = .82$, $P <.001$).

Chart ratings.—Complete data including an adequate number of patient ques-

TABLE 1
MEAN CHART SCORE AND QUESTIONNAIRE SCORES FOR HIGH-RANKED VS. LOW-RANKED
RESIDENT GROUPS AND FAVORABLE VS. NOT FAVORABLE PHYSICIAN GROUPS

	Resident group, high-ranked by supervisors and nurses	Resident group, low-ranked by supervisors and nurses	Patient group, favorable toward physician	Patient group, not favorable toward physician
Chart rating score	58.8*	51.2	56.6	53.3
Patient questionnaire:				
Total score	46.2	46.4	51.2†	41.0
Physician items score	21.7	21.3	24.4†	18.3
Hospital items score	17.2	17.4	18.5†	16.0
Nursing items score	5.3	6.3	6.2*	5.4

* = Difference significant at .05 level.

† = Difference significant at .001 level.

tionnaires, supervisors' ratings, and nurses' ratings were obtained for sixteen residents. Thirteen of these were on medical wards, and three were on tuberculosis (TB) wards. For each of these residents three cases whom they had treated were randomly selected. Charts of these patients were rated by means of a detailed check sheet which was a modification of the Medical Audit Check Sheet prepared by the American College of Surgeons and the Commission on Professional and Hospital Activities, Inc. Included were scaled ratings of the following variables: history, laboratory, x-ray, consultations, physical exam, treatment and progress notes. A second set of items consisted of eight questions to be scored relating to qualitative aspects of medical management of the case. *A priori* weights were assigned to all the variables on the basis of judged importance. The total score was the sum of these weighted scores assigned by the rater to each of the separate variables. In addition, global ratings were made for over-all management of the case. Prior study had suggested some reliability for ratings based on this approach.

RESULTS

Table 1 shows the Kruskal-Wallis Analysis of Variance by Ranks (8) with the resident physicians categorized as

High Ranked or *Low Ranked* in terms of staff ratings and the patients categorized as *Favorable* or *Not Favorable* toward their physician in terms of the two selected items. In this comparison the *High-ranked* residents had higher mean chart ratings.

The ratings of the chief, the assistant chief, and the charge nurses showed high agreement, as indicated by the statistically significant Coefficient of Concordance (8) $X^2 = 58.8$, $P < .001$. Since all three criterion ratings were highly correlated, the residents could be ranked in terms of the *sums* of these rankings by the two supervisors and the nurse. Against this combined criterion, the Coefficient of Concordance was computed for chart ratings and found not to be significant ($X^2 = 21.8$, $P > .50$).

The *High-ranked* and *Low-ranked* residents were not rated differently by their respective patients. The power of the Selected Items is indicated by the fact that this index yielded a reliable separation on all questionnaire variables, including total questionnaire score, total score on physician items, total score on general hospital items, and total score on nursing items.

DISCUSSION

The data would appear to lend some support to various assertions to the effect that charts rated by an expert

can be an indication of quality of care if it can be assumed that competency is an index of quality. When residents were dichotomized into *High-ranked* and *Low-ranked* in terms of supervising physicians' and nurses' ratings of competency, the chart ratings corresponded to these ratings at a better than chance level. On the other hand, although more of the high-scored charts came from high-ranked residents and vice versa, high-ranked residents could produce some charts which received a low score and, by the same token, low-ranked residents could produce some charts which received a high score.

In view of the high reliability of the rankings by supervising physicians and nurses, it would seem that these ratings are a valuable means of comparison. Some sharing of values not closely related to absolute standards of professional competency could account for the high reliability, but close study of the data suggests the likelihood that competency in terms of current professional standards was the main variable on which the ratings were based.

Apparently, from the statistical findings, the charts were rated on a different set of variables than the supervisors' and nurses' rankings. Although these chart variables may have had validity in their own right, it would seem likely that the rating of charts results in a failure to include important variables which are included by supervising physicians and nurses who observe the residents in action and, in addition, are likely to know something of their personal characteristics both past and present. Although the present findings could be interpreted to support the positions of both those who advocate the method of chart ratings and those who criticize it, if a choice had to be made between either chart ratings or staff evaluations, the latter would seem to be the method

of choice. In actual practice, such a choice would not be necessary, since it would be possible, and perhaps desirable, in view of the relative independence of the measures, to use a combination of the staff evaluations of competency with independent ratings of a sampling of residents' charts.

The high degree of consistency between the various sections of the patients' questionnaire would indicate some overriding general attitude which is manifested similarly toward all aspects of hospitalization as well as toward the physician. The questionnaire would appear to be sensitive in view of the difference in mean score between TB patients (39.8) and medical patients (49.0) which is reliably different and in the expected direction. Inspection of comments elicited in the questionnaires suggested that an attitude of guardedness or defensiveness was not likely the major variable which generated the general attitude. Variables such as personality characteristics, age, socio-economic status, intelligence, and type of illness, which were beyond the scope of the present study, might be presumed to be important determiners of general hospital attitude. It would not appear that the patient attitudes are related to a significant degree to either chart excellence or staff evaluations of competency of residents. Assuming that both of these measures are related to quality of care this finding seems to support comments cited above to the effect that patient happiness should not be accepted as *prima facie* evidence of patient welfare.

Qualitative factors which could be inferred from the data are of considerable interest. Three-fourths of the TB patients had *Not Favorable* physician attitudes as reflected in the Selected Items. Yet, one physician (who was first in the staff ratings) was able to reverse this

trend and obtain *Favorable* ratings from 71 per cent of his TB patients. Another physician had no *Favorable* responses on the Selected Items from his TB patients. This would suggest a difference in personality characteristics and/or in social stimulus value between such individuals. One resident, a non-white, who was uniformly highly liked by staff and who was rated in the upper third of residents by supervisors, had all of his 21 patients give him a *Favorable* rating on the Selected items. By contrast, another resident who also ranked in the upper third in terms of staff ratings had one-third of his patients give *Not Favorable* ratings on the Selected Items. It seems likely that some physicians possess qualities which can elicit favorable attitudes even from patients who ordinarily might be expected to be somewhat negative. It is quite possible that these qualities characterized all of the interpersonal relationships of these individuals. However, if such personality characteristics represent stable character traits they must be accepted *de facto* and are, therefore, only of academic interest in the present context.

SUMMARY

First-year residents were appraised in terms of supervisors' rankings of competency, nurses' ratings of ward performance, patients' evaluations of physicians by means of a questionnaire, and independent ratings of quality of care from charts. Ratings of competency corresponded to ratings of charts at a better than chance level. However, high-ranked residents produced many low-scored charts and vice versa. Supervising physician and nurses showed a high level of agreement in their rankings of residents. The over-all findings were interpreted as suggesting that, in the event a choice had to be made between staff evaluations and chart ratings as

means of evaluation of residents, the former would be preferred; but, since the chart ratings and supervisors' evaluations seemed largely to be tapping different variables, a combination of the two might be optimal. Patients' evaluations of their physicians did not agree with staff evaluations of competency or with chart ratings reinforcing some current notions to the effect that patient happiness is not identical with patient welfare. Some observations regarding the effect of personality characteristics of physicians on their patients were reported.

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MEDICAL EDUCATION FORUM

Editorials

O CANADA !

An opportunity to listen to the stirring words of the Canadian National Anthem, "O Canada," rouses a fresh interest in our neighbor to the North. Now the opportunity to visit Montreal in a few weeks for the annual meeting of the A.A.M.C. rouses a fresh interest in medical education in Canada. We should know more about it.

The Canadian medical schools are associate members of the A.A.M.C. They participate in the joint A.A.M.C.-A.M.A. accreditation program in which representatives of those organizations are joined by a Canadian dean. Yet there are few medical educators in the United States who have a grasp of the total program and problems of medical education in Canada.

The review of medical education in Canada published in the international number of this journal last month indicates that there are common problems facing medical education on both sides of the border. The need for well qualified students, adequate finances, a scholarly faculty, and modern facilities are deficiency states that are endemic to varying degrees in the world of medical education.

The roots of medical education in Canada have been historically in the British and French systems. Undoubtedly this heritage of meticulous clinical observation and bedside teaching brought to the United States from Canada by Sir William Osler is a debt to Canada that we can hardly repay.

It is particularly fitting that Wilder Penfield, who has been a great stimulus to the advancement of neurophysiology and neurosurgery on both sides of the border, has been chosen to present the Alan Gregg lecture. One of Dr. Gregg's last great lectures was delivered at a commemorative ceremony at the Montreal Neurological Institute at the invitation of Wilder Penfield.

We look forward to the visit to Montreal. Undoubtedly Sir William Osler would be pleased to join us.

THE INDIAN JOURNAL OF MEDICAL EDUCATION

Medical education in India is advancing at a rapid rate. New medical schools have been established, and curricula have been reviewed and revitalized by faculty members imbued with progressive educational ideals.

A recent communication reported on the establishment of the Indian Association for the Advancement of Medical Education. Now it is pleasant to learn that the first issue of the *Indian Journal of Medical Education*, published under the sponsorship of the Association, is in press.

The editorial responsibility rests with Dr. Jacob Chandy, Christian Medical College, Vellore, South India. Dr. Melvin Casberg, a former member of our Editorial Board and a frequent correspondent from India, has been an enthusiastic participant in the establishment of the Association and of the journal.

Fortunately, as a part of its massive development program, the government of India has recognized the importance of strengthening and expanding medical education. The establishment of a national organization concerned with medical education and a scholarly journal are significant achievements for India and Asia. We look forward to editorial communications with our friends in India.

CONTINUING PROBLEMS ON GENERAL PRACTICE

Criticism of the 2-year basic program to prepare physicians for general practice is on the rise. The program was recommended by a committee which included representatives of the A.M.A., A.A.M.C. and A.A.G.P. Medicine, Pediatrics, Psychiatry, Emergency Room, and Outpatient Clinic are the major ingredients of the program. Representatives of the American Academy of General Practice and several specialty groups are critical of the failure to include Obstetrics and Surgery. They feel that without qualifications for general surgery and operative obstetrics, the general practitioner will not gain access to hospitals but will be relegated to a clearing house status.

Five pilot programs in harmony with the recommendations outlined above were initiated this year. None of the programs filled their quota, and three had no applicants.

As a corollary to the criticism of the basic program is the expressed belief that the medical schools actively discourage graduates from careers in general practice. We are supposed to serve, instead, as recruitment centers for general practitioners. An interesting article by T. E. Rardin, M.D. (*J.A.M.A.*, 176: 479, 1961) suggests that all medical schools should have units of family practice with administrative identity as departments. These departments would be staffed by family physicians capable of dedicated teaching.

The critics of the basic program seem to overlook the word "basic." If general practice is a specialty comparable to the recognized disciplines, then a physician should be willing to spend comparable amounts of time in preparing for his career.

There is no evidence that medical schools are deliberately diverting medical students away from careers in general practice. The attitude of professional colleagues, the public, and hospital authorities are important factors. Coupled with this, in recent years, has been such open dissatisfaction among general practitioners that medical students and house officers are diverted from joining them.

JOHN Z. BOWERS, M.D.

Datagrams

ASSOCIATION OF AMERICAN MEDICAL COLLEGES UNDERGRADUATE ORIGINS OF MEDICAL STUDENTS

A relatively small number of colleges and universities continue to supply the majority of students admitted to U.S. medical school each year. Table 1 shows the 25 undergraduate institutions that supplied the largest numbers of entering first-year medical students in 1952, 1954, 1956, 1958, and 1960, and the number of students who came from each of these schools each year. Although some students obtained their premedical education at two or more institutions for purposes

TABLE 1
25 COLLEGES AND UNIVERSITIES
PRODUCING THE LARGEST NUMBER OF ENTERING FIRST-YEAR MEDICAL STUDENTS
(1952-1960 IN TWO-YEAR INTERVALS)

	1952		1954		1956		1958		1960
School	No. of Ent. Med. Stud.	School	No. of Ent. Med. Stud.	School	No. of Ent. Med. Stud.	School	No. of Ent. Med. Stud.	School	No. of Ent. Med. Stud.
*Harvard	169	Harvard	174	Harvard	162	Harvard	182	Harvard	164
*Michigan	155	Michigan	136	Illinois	151	Michigan	164	Michigan	145
*Columbia	121	Illinois	105	Michigan	145	Illinois	121	Illinois	135
*Emory	98	Columbia	96	Columbia	145	Columbia	120	Columbia	131
*Indiana	96	Cornell	93	Wisconsin	122	Princeton	106	Princeton	120
*N.Y.U.	96	Yale	92	Cornell	107	Yale	101	Cornell	96
*Minnesota	96	Indiana	90	Yale	94	Penn.	98	Yale	96
*Illinois	95	Ohio State	90	Texas	91	Notre Dame	94	Wisconsin	93
*Yale	87	Cal. S.F.	90	Princeton	87	Cornell	94	Indiana	91
*Stanford	86	Minnesota	90	Cal. S.F.	87	Cal. S.F.	92	Dartmouth	91
*Princeton	85	Penn.	90	Minnesota	87	Wisconsin	87	Texas	89
*Penn.	83	Texas	84	Indiana	80	Dartmouth	84	Penn.	86
Pittsburgh	83	Wisconsin	79	Emory	78	Texas	83	Cal. S.F.	84
*Cal. S.F.	83	Emory	78	N.Y.U.	76	Cal. L.A.	82	Minnesota	84
*Wisconsin	82	Pittsburgh	78	Dartmouth	76	Stanford	81	Duke	83
*Texas	82	Princeton	76	Penn.	75	Emory	81	Stanford	81
Alabama	73	N.Y.U.	72	Stanford	74	Indiana	79	Ohio State	78
*Cornell	73	Stanford	70	Iowa	73	Minnesota	77	Cal. L.A.	73
Cal. L.A.	73	Alabama	70	Ohio State	72	Ohio State	76	Tulane	69
Kansas	71	Tulane	66	Cal. L.A.	71	Wayne	74	Wayne	69
Iowa	65	Dartmouth	65	Tennessee	68	N. Carolina	66	Emory	68
La. State	63	Duke	63	N. Carolina	64	Tulane	64	Iowa	63
Vanderbilt	62	Kansas	62	Notre Dame	62	Pittsburgh	62	Kansas	62
*Ohio State	61	N. Carolina	61	La. State	61	N.Y.U.	61	N.Y.U.	61
Duke	60	Holy Cross	59	Alabama	59	Duke	61	Notre Dame	56
TOP 25 SCHOOLS									
TOTAL	2,198		2,129		2,267		2,290		2,268
ALL SCHOOLS									
TOTAL	7,381		7,424		7,835		7,925		8,075
PER CENT FROM TOP 25 SCHOOLS	30%		29%		29%		29%		28%

* Among top 25 schools in all five years.

Submitted by the Division of Basic Research of the A.A.M.C.

of this report each student has been assigned to only one school. If the student held a baccalaureate degree (or degrees), he was credited to the school from which he received the degree (or the first such degree). If the student had no degree he was assigned to the college at which most of his premedical course work was taken.

Seventeen schools were among the top 25 "suppliers" of medical students in all five of the years included in this study. (These 17 schools are asterisked in the first column of Table 1). In these five years they produced more than one fifth (22 per cent) of all entering first-year medical students. In this consistently high group, 9 are privately supported and 8 are publicly supported schools. A regional breakdown places 7 of these schools in the northeast, 6 in the north central, and 2 each in the southern and western sections of this country.

Table 1 also shows the total number of entering first-year medical students each year, and the proportion of the entire entering freshman class supplied by the top 25 undergraduate schools. Although the top 25 schools comprise only about 3 per cent of all undergraduate institutions that supply one or more medical students in a given year, this group typically provides almost 30 per cent of the entering freshman class for that year.

Table 2 shows the number of colleges and universities that have provided 75 per cent and 90 per cent respectively of all entering first-year medical students in each even numbered year since 1952. This table also shows the total number of undergraduate schools that supplied one or more students each year, and the proportion of these schools from which 75 per cent and 90 per cent of the entering first-year medical school class was drawn.

TABLE 2
NUMBER AND PER CENT OF PREMEDICAL SCHOOLS*
PROVIDING 75% AND 90% OF ENTERING FIRST-YEAR CLASSES
(1952-1960 IN TWO-YEAR INTERVALS)

Year	Premed. Schools Supplying 75 % of Entering Class		Premed. Schools Supplying 90 % of Entering Class		Total No. of Premed. Schools
	N	Per Cent	N	Per Cent	
1952	163	23%	327	45%	723
1954	162	23	329	46	708
1956	165	23	329	46	723
1958	174	23	346	45	762
1960	178	23	349	45	772

* Colleges and universities supplying at least one first-year medical student.

Since 1954 there has been a gradual increase in the number of institutions providing one or more new medical students each year. However, in any given year the entire entering freshman class has come from fewer than 800 colleges and universities. Nine out of 10 entering first-year medical students typically come from fewer than half (45 per cent) of these "premedical" schools, and three-fourths of the freshman class comes from less than one-fourth (23 per cent) of these institutions.

Address

THE CONTRIBUTION OF SOCIAL WORK TO MEDICAL EDUCATION*

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Everyone concerned with medical care realizes that social and psychological factors affect the results of treatment. Factual evidence to support this is, however, very meager. Important supporting evidence was produced by Professor Querido of the Department of Social Medicine of the University of Amsterdam and set out in the *British Journal of Preventive and Social Medicine*, 1959. He describes an investigation into the clinical, social, and medical factors determining the results of hospital treatment. He said, "It may seem superfluous to demonstrate that the patient who is burdened by cares or conflicts in his life, will conquer his illness less easily than somebody who is not so burdened. The phenomenon may be self-evident but its consequences remain formidable." This investigation showed that, out of 1,630 patients, a favorable clinical prognosis was made in respect of 1,128 of this number. However, a subsequent follow-up indicated that only in 660 out of 1,128 cases was the favorable prognosis, in fact, realized. Thus he inferred that only approximately half the patients investigated were able to derive full measure of benefit from the medical care provided for them. He, therefore, concluded that therapeutic action was required "to make their going more easy," and that "this help (after-care, social work, case work, psychotherapy, etc.) must be determined during the stay in hospital."

Similarly, Miss Madge Dongray, a medical social worker at the Derbyshire House Health Centre, Manchester University, in an article in the *British Medical Journal*, 1958, demonstrated the same need in the general practitioner service, and pointed to the unique opportunities there for social and preventive work and, in particular, the recognition of the early signs of social and emotional breakdown amongst patients. These two independent investigations emphasize the interaction and interrelation of medical, social, and psychiatric factors and therefore raise the whole question of how far the doctor, in his role as medical adviser, should be equipped to recognize these social needs and what sort of help he should be expected to give his patients. The subject is a controversial one, because some doctors tend to regard social problems as being outside their scope, and at the other extreme there are others who accept total responsibility themselves, and endeavor to take all necessary action, to the exclusion of social workers.

In 1944 a Committee of Enquiry into the working of medical schools under the chairmanship of Sir William Goodenough invited the Institute of Almoners, which is the professional association for medical social work in Britain, to give evidence regarding the role of the almoner (medical social worker) in a teaching hospital, and the following statement was submitted:

"It is realized that almoners' work is concerned with only a small part of the wide field of social medicine, yet within the hospital the almoners' department is the means by which the principles of social medicine and diagnosis may

*An address given on February 15, 1961, at The College of Medicine, University of Saskatchewan, Canada.

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be demonstrated in the treatment of patients. It is useless to lecture to students on the importance of considering living conditions in the treatment of certain diseases if, owing to inadequate staffing in the almoners' department, they see that patients leave the hospital sometimes without advice or help concerning social factors influencing their health. The students must see in practice the application of the principles they are taught. It is therefore essential that the teaching hospital should face the necessity of maintaining or of building up an almoners' department adequate to meet the standard set by the medical school. In other words a first rate medical school must be served by a first rate almoners' department."

The report of the Goodenough Committee, which was subsequently published, underlined the need for a wider conception of the duties of the social worker in a teaching hospital. These duties can be briefly summarized. The medical social worker shares with the doctors in the discovery of those aspects of the patient's social and psychological background which are relevant to understanding the patient and his illness.

However, it was not until July 5, 1948, when the National Health Service came into operation, that the proper function of the medical social worker was officially recognized. All hospitals were advised that "Medical Social Workers were equipped to co-operate with the medical staff in their treatment of the patient" and that the Social Service Department might be used as a "focal point" for much of the teaching on social questions appropriate for medical students and nurses.

The difficult transitional stage with the need for a re-examination of the duties of medical social workers has now been surmounted, and the full recognition of her status in the Younghusband Report has been made. Here she is defined as the "caseworker in the medical setting . . . She assesses the personal, family or social factors relevant to medical diagnosis and treatment, and helps patients to deal with these stresses, and tries to solve problems which may be causing anxiety and strain, or which delay response to medical treatment. She is trained to help people in the acceptance of, or adjustment to, illness or disability and to modify disturbed, emotional or family relationships. In doing this she uses casework skill. . . .

"The medical social worker has a sound knowledge of the government and voluntary services, she co-operates with these and acts as a liaison between the individual or family and the agencies which can help; but her main contribution lies in her understanding of the social implications of and human reactions to, disease, and in her ability to assist the family or individual to meet their difficulties."

It is worth quoting a statement, which was jointly agreed by the Royal College of Physicians, the Royal College of Surgeons, the Royal College of Obstetricians and Gynaecologists, and the College of General Practitioners with the Institute of Almoners and published in *The Lancet* (June 6, 1955), describing the work of the medical social worker. It reads as follows:

"The purpose of medical social work is to help the patient to recognize and overcome personal and environmental disabilities affecting his health or associated with his illness or preventing him from making effective use of medical services available to him. Through a relationship with the medical social worker,

a patient or his family, may be helped to define difficulties, to find ways of overcoming them, and to make constructive use of assistance, such as information and material services, and of understanding and support in distressing situations. The recognition of medical social problems and the selection of patients who need social help is a matter requiring close co-operation between doctor and medical social worker. In her association with medical and nursing staff opportunities arise for her to make a contribution to consultation and discussion and sometimes for more formal teaching on social problems."

Training for medical social work in Britain entails a university education in Social Science leading to a diploma which normally takes 2 years' full-time study with integrated field work. An increasing number of students are taking 1 additional year in order to qualify for the degree in Social Science. This basic training is followed by a further 1 year's professional education in Medical Social Work which is available through the Institute of Almoners' Training School and parallel courses in seven universities. Classwork consists of courses in Social Casework (50 hours), the field of Medical Social Work (50 hours), Human Growth and Development (42 hours), and Medical Information (36 hours). Field work, which is arranged concurrently with classwork, consists of supervised case work practice in selected hospitals or public health departments. Students who successfully complete either the Institute's course or one of the listed professional courses in the Universities may be entered on the Register of the Institute of Almoners and so become qualified to work in the National Health Service.

After this brief description of the training of the Medical Social Worker which includes considerable emphasis on medical information and clinical work in a hospital setting I hope that you will agree that she is equipped to carry out the duties which I briefly summarized before. As you will remember I said that the medical social worker shared with the doctors in the discovery of these aspects of the patient's social and psychological background which are relevant to understanding the patient and his illness.

In this activity she will particularly recognize and evaluate the significance of the social situation. However, I do not believe that this aspect of treatment should be filtered out and handed over to any one person as a sole responsibility, be it medical social worker, doctor, nurse, physiotherapist, or occupational therapist. Because her training has been concentrated upon understanding the social and emotional aspects of human behavior particularly in relation to illness and medical care, she can help the medical staff and the other team members by increasing their understanding of the social factors, and in this way she may enable the patient to cooperate more readily in the treatment given. This entails individual social case work with the patient in the hospital, social case work with his family, and personal contact with the appropriate government and voluntary social services concerned. This very often means the removal or control of external causative factors which, unless dealt with, will hamper the effectiveness of any medical care offered. All the professional groups concerned with the care of the patient have some training and experience along this line, but the opportunity for joint consultation with the medical social worker who is in fact a specialist in this field can help to reduce the number of situations sometimes called "failures to co-operate," as well as lessening the time necessary

for recovery and the reintegration of the patient into the community. A large proportion of her work is inevitably taken up with helping patients and their relatives to adapt themselves to situations, which cannot be modified owing to the nature of the medical condition, which may be irreversible or because the patient's own approach to his problems is exclusively self-centered and, if resolved on his conditions, might raise greater problems to his relatives and the community at large.

The doctor usually asks for the medical social worker's help when he considers that the patient has some personal, family or environmental problems which have a bearing on the diagnosis and are likely to influence the course of treatment. For example:

- (1) Anxiety about medical and surgical treatment or about admission to or attendance at hospital.
- (2) Fears about the consequences of illness or injury.
- (3) Need for help in obtaining and using special services in medical care and rehabilitation.
- (4) Difficulties in the patient's social environment associated with his illness or affecting his health.
- (5) Problems in personal adjustment peculiar to prolonged illness or disability.
- (6) Situations in which mind and body are reacting on one another and illness results.

Statement of Institute of Almoners, 1958.

Dr. Michael Warren of the Department of Social and Preventive Medicine, Royal Free Hospital Medical School has recently reviewed the contribution of the medical social worker (*The Almoner*, Vol. 13, 1960). He describes her as an "expert in understanding the patient's reactions to illness, his family problems, his doubts, worries, and ruminations and his own misunderstanding of the situation. She is the expert on the mobilization and the use of the government and voluntary social services. Her skills are complementary to those of the clinician and the specialist in social medicine."

In order to understand the special contribution of the medical social worker it is important to set out some kind of definition of "casework" which is the method by which she helps patients. I cannot do better than to give you a definition which has been quoted in the Younghusband Report on Social Workers in the Local Health and Welfare Services (1959).

"Casework is a personal service provided by qualified workers for individuals who require skilled assistance in resolving some material, emotional or character problem. It is a disciplined activity which requires a full appreciation of the client in his family and community setting. The caseworker seeks to perform this service on the basis of mutual trust and in such ways as will strengthen the client's own capacities to deal with his problems and to achieve a better adjustment with his environment. The services required of a case-worker cover many kinds of human need, ranging from relatively simple problems of material assistance to complex personal situations involving serious emotional disturbances or character defect, which may require prolonged assistance and the careful mobilization of resources and of different professional skills."

It is not suggested that medical social workers have any monopoly on helping people to make a better adjustment between themselves and their circumstances, and here I would like to quote further from the Younghusband Report.

"The complexities of human nature in its physical, mental, emotional and social aspects are such that various professional skills are involved, often in combination with each other. The point or points of intervention should obviously be where they will be most effective. The restoration of or improvement in ability to function acceptably is a common endeavor of medicine, education and religion as well as of social work. This is also one of the reasons why team-work and referral are now regarded as a necessary part of successful work in these fields."

It is, therefore, becoming more and more accepted that these various professions need basic knowledge about human relationships, social attitudes, and the mobilization and use of social services. In this area medical education should look for help to the psychologist, sociologist, social anthropologist, and psychiatrist, as well as the social worker.

In contributing to the teaching of social medicine to the medical students the medical social worker has five objectives which may be briefly summarized as follows:

1. To give the medical student an understanding of the relevance of systematic consideration of economic, environmental, and psycho-social factors to the clinical picture of the patient's illness.
2. To add to his ability in identifying and evaluating these factors so that he may understand more readily the patient's reaction and that of his relatives to his illness.
3. To increase his knowledge of and use of the social services to meet the social needs of his patients within his function and competence as a doctor.
4. To give him understanding of the point at which social care requires an expert and what particular expert should be sought, i.e., Medical Social Worker, Psychiatric Social Worker, Public Health Nurse, etc., etc.
5. To add to the help given him by others in understanding his own attitudes to patients and their difficulties. This being usually given in general discussion by means of person to person consultation and in case conferences when the medical social worker can perhaps offer a fresh perspective concerning these attitudes.

At the Royal Free Hospital the teaching in preventive and social medicine is spread throughout the 3 clinical years, and its content is arranged by the senior lecturer who is in charge of the department under the auspices of the medical school which is part of the University of London. The Social Service Department of the Hospital does not come under the control of the Head of the Department of Social Medicine and is quite separate from the Medical School and is administered by the Chief Medical Social Worker who is responsible directly to the Board of Governors of the Hospital.

Historically, the Hospital has a strong humanitarian tradition which it owes to its distinguished founder, Dr. William Marsden, who wrote in 1828 of "those who on every change of the wind of trade and business are the first to feel the pangs of hunger; those more especially of the female sex, who have been blasted in their early bloom and turned adrift to the worst peltings of the pitiless storm of life; and who, when disease is added to their already overwhelming load of wretchedness and shame, have no recourse but to lie down and die. Surely these are objects of the deepest possible commiseration and it was for these that the Royal Free Hospital was established . . . that they might have

a place to go to where help and consolation would at once be given" (quoted by Frieda Sandwith in *Surgeon Compassionate*, 1960).

There has always been a close association with the medical school, which is proud of the fact that the hospital was the first in Britain to have started a department of medical social work in 1895; and immediately the Goodenough Committee report in 1944 implemented its recommendation by inviting the head of the Social Service Department of the hospital to give two lectures a year on the function of her department to the clinical students during their first 3 months in the hospital. However, it was not until 1949 that the teaching of social medicine became structured when a lecturer was appointed jointly with the London School of Hygiene and Tropical Medicine. Right from the outset the help of the medical social workers was sought, and I am privileged to have been associated in the teaching since the appointment of the first joint lecturer, Dr. T. McL. Galloway, and then with his successors, Dr. Alison McDonald, Dr. Alexander Robertson, and currently with Dr. Michael Warren. To the Dean of the Royal Free Hospital Medical School, Dr. Katherine Lloyd Williams, I am especially grateful for her constant interest in the work of the Social Service Department and for help to me personally by sponsoring first my visit to the United States in 1953 and now my visit to Canada.

I will now attempt to describe the way in which the chief medical social worker and her staff participate in current teaching. Soon after the students start their clinical training they are introduced by Dr. Warren to the chief medical social worker who is given the opportunity to talk with them informally about the function of the Social Service Department in the hospital. The large group of students is then broken down into two or three small ones. Each group then meets two or three of the other medical social workers, who illustrate from current social problems in general medicine, surgery, and pediatrics, the interrelationship of social and medical care of the patient. The aim of this is to stimulate the students to think of patients as people, members of the community, often with severe social problems which illness accentuates, whose recovery may be delayed if their problems are left unrecognized and not given appropriate help.

During their second clinical year, when they are attached to the posts of ophthalmology, dermatology, and rheumatology, the chief medical social worker has a further opportunity in collaboration with Dr. Warren to present and discuss social case histories which relate in particular to the care, rehabilitation, and resettlement of handicapped patients and the special problems of the chronic sick. The case material for these discussions is obtained from the Hospital's Resettlement Clinic, of which Dr. Warren is the chairman and the chief medical social worker an active participant. This is a very real advantage, because the discussions are concerned with actual practice rather than with only theory. In fact, the students see the hospital services as dovetailed with those of the local authority and general practitioner.

The main contact however, between the medical social workers and the students takes place at the case conferences and in the preparation of the students leading up to the actual presentation of the case. These conferences are arranged when the students are doing their junior medical clerkship, and then during their final year when they are attached to Pediatrics. In the initial dis-

cussion with the students, Dr. Warren, accompanied by the registrar, who is the equivalent of your senior resident, and the medical social worker, gives some guidance about the selection of the patient for their social study, and advises the student to look to the medical social worker for help in this as well as continually keeping in touch with her throughout the study. A home visit is always made by one or two of the students with the approval of the general practitioner whose help will have been sought by Dr. Warren. The medical social worker may suggest visits to several social agencies concerned and make any necessary introductions to them and so pave the way for the students. Our experience has shown that the patients and their families warmly welcome the students, and rarely does it happen that they are refused entry. Throughout the period of preparation the students are in constant touch with the medical social worker, and from time to time plans may have to be modified. This contact is essentially an informal one and may take place in the Social Service office or occasionally in a ward. Because of this the student has a unique opportunity of appreciating the special contribution of the medical social worker to the patient's care. At the same time, the medical social worker can herself help the student, who may have become very much involved with the patient and his problems and who may need some help and guidance in clarifying his ideas. There is little doubt that this close association between the medical social worker and the student is manifesting itself in the easy and understanding relationships which exist between successive residents and medical social workers who have worked together in this teaching situation.

The students usually spend at least 2-3 weeks preparing their cases and at the conference present the details to Dr. Warren, the Head of Social Medicine, the attending physician, the senior resident, the intern, the chief medical social worker, the general practitioner, the public health nurse, etc., and the rest of the students on the service. The chair is taken by Dr. Warren. At these conferences, the effects of the social conditions on the aetiology, treatment and prognosis of the disease are discussed as well as the contribution that the Social Service Department within the hospital and the social services outside make to the future care of the patient and his family.

SUMMARY

In this paper I have demonstrated the need for the medical students to be taught not only to recognize the social and psychological needs of patients, but also the need to initiate social action in cooperation with the appropriate social services. Reference has been made to factual evidence in support of this by Professor Querido in his investigation into the clinical, social and mental factors determining the results of hospital treatment, and also to a similar study by Miss Dongray, a medical social worker, which relates to the same need in General Practice. The role of the medical social worker in a teaching hospital has been described, emphasizing the extent of her contribution in teaching medical students in collaboration with the Department of Social and Preventive Medicine. The methods of teaching at present employed at the Royal Free Hospital have been discussed, showing that the cooperation between the Department of Social and Preventive Medicine and the Social Service Department is one of partnership.

Communications

PREMEDICAL TRENDS

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In the capacities of a faculty advisor for premedical students, the histologist of our department, and current chairman of the Arts and Science curriculum committee, I am acutely aware of two trends among students in the premedical curriculum. The first is one of acceleration and the second is an overwhelming obsession for science. The latter aspect is paradoxical in that, as offerings are increased, more is expected.

There is reason for deep concern relative to these two aspects. An informed and scholarly reappraisal is in order. The educator can be sympathetic to current trends of acceleration but only as it relates to the talented student—certainly, never at the expense of a balanced program. The Liberal Arts College has at least two clear-cut responsibilities to its student body: first, to provide a core curriculum of subject matter, within the framework of a concept of a Liberal Arts College, of all the disciplines which have the valuable effect of enforcing an enlargement of both mind and temper; second, to offer subject matter which can ultimately be used as a means of livelihood.

The premedical student, immediately upon entering, insists on being so labeled. Automatically then, he is exposed to a terrific emphasis to, and soon becomes obsessed with, science. The chasm between science and the humanities is becoming more formidable. C. P. Snow in his *Two Cultures* points out succinctly the difficulty in communication which exists.

A liberal arts education should not be only utilitarian; it should provide vitality, beauty, and an intellectual and moral challenge. The central theme should be the striving for an understanding of the factors involved in a better life. All the disciplines contribute to this theme; the disciplines are merely different aspects of this fundamental phenomenon.

To attain this goal there should be less rigidity in the premedical curriculum. Each college has its own core curriculum as designated by its faculty. Schools of medicine have superimposed their own pre-professional requirements upon the candidate. The typical premedical student is rapidly becoming a mental technological machine concerned only with objective scientific synthesis. He fails to see the value of symbiosis and fails to thrill in the warm subjective experiences of a true liberal arts education. Unless the philosophy of premedical training changes quickly, we will continue to wean students unable to appreciate the interrelationship of science with the other disciplines. The man of medicine reflects his training. To a considerable extent he is not taking full advantage of a liberal arts education. The missing disciplines in his program are those concerned with the mysteries and beauties of life. The premedical curriculum should be geared to achieve maximum perspective by availing itself of the resources of the many disciplines. The value of the curriculum is directly proportional to

the extent that it concerns itself with humane education, better living, and, equally important, better understanding.

When a young scientist enters a laboratory he is told to remove the cloak of imagination. Perhaps this is why the study of science is often so frustrating. Be assured that many phenomena cannot be explained. A little life needs to be put into the curriculum. Let curiosity run rampant. Take notes from the philosopher who is relatively satisfied when he can live adequately with an unexplainable phenomenon. Science, by itself, cannot furnish all the answers; it must ally itself with the other disciplines—only then will a semblance of perfection be reached. Truths are relative and can often be best interpreted on the bases of interrelationships. The premedical curriculum is now almost an island of scientific isolation. This trend must be altered. There must be an ever-increasing contact with all facts of education. The premedical student will then become less dogmatic, certainly more humble, when exposed to many of the disciplines. Prospective students of medicine have the responsibility of acquiring an understanding of the interrelations and interdependence of the disciplines.

No accelerated or combined premedical program should be carried out at the expense of depth in the liberal arts program. The credits earned during the first year in medicine should serve only one purpose in a combined program—i.e., to complete the total number of credit hours needed for a degree. Under no circumstances should these credits be used as hours toward the concentration in the undergraduate program. Herein lies much of the trouble. The premedical student should be willing, if not, encouraged, to explore the offerings of the undergraduate college. A concentration, science or otherwise, in the framework of a liberal arts college—divorced from the vocational and professional atmosphere of the medical school—would be an enrichment process. A function of a liberal arts program is to supply both the depth and breadth of the student's education. We are vitally concerned with mastery of concepts as provided in the concentration, and similarly we are equally concerned with the survey aspect of the student's education.

Comparing groups of students (premedical vs. prelegal, for instance) the premedical group is socially and politically quite uninformed. There is one remedy—that being an adequate exposure to the varied disciplines. This is conducive to understanding, the acquisition of basic insights, and the ability to indulge in creative and constructive thinking.

It is not my intention, which would be rather presumptuous, to suggest a radical departure from the classical premedical curriculum. I do, however, offer for consideration the following thoughts:

1. The science aspect should not be neglected, but rather strengthened by an alliance with the other disciplines.
2. Except for exceptional students, the trend toward acceleration should be actively discouraged; this would be inevitable were the core curriculum made broader.
3. Use of the credits earned during the first year of medicine should be discontinued as an undergraduate concentration. It is becoming increasingly difficult to justify the dual role assigned to the first year of medicine.

LABORATORY ANIMAL MEDICINE AND THE MEDICAL SCHOOLS

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During the past decade the concept of laboratory animal care has become one that is more complex than merely "caring for the animals." This period saw the development of a new area of specialization in veterinary medicine known as laboratory animal medicine, the formation of the American Board of Laboratory Animal Medicine, the development of the Animal Care Panel, the creation of the Institute of Laboratory Animal Resources by the National Research Council, and increased breadth of activity by the National Society for Medical Research.

In order for a medical school's laboratory animal unit to most effectively aid the teaching and research activities of the institution it should itself have responsibilities in the areas of teaching and research in addition to its service function. The unit should represent veterinary and comparative medicine as a discipline in the academic community. The laboratory animal unit should be so organized that it can provide consultations with research investigators on the selection of the proper animal species for a given experiment, advice on the spontaneous diseases of the particular species that might complicate results, suggestions for inducing various disease states, and aid with the interpretation of experimental animal data.

The teaching responsibilities of the laboratory animal unit might take the form of a formal graduate course dealing with the techniques of animal experimentation and details of animal care, or they might be quite informal and involve the instruction of individual technicians and research investigators.

Research in laboratory animal medicine is currently in three principal areas. Many units are actively carrying on research programs dealing with the infectious diseases of laboratory animals. The techniques of differential diagnosis for the diseases of laboratory animals have not yet been well worked out nor is there much information on the effect of a number of subclinical diseases on experimental results. Another active area of research has been the study of spontaneous laboratory animal diseases which in some way resemble human disease problems that might be used as experimental tools. The third type of research programs that are currently under way are designed to elucidate the physiological reactions of the laboratory animals to their environment.

The laboratory animal veterinarian should establish and maintain standards of husbandry services. He should be responsible for the training of husbandry personnel, control and standardization of laboratory animal diets, the use of proper bedding materials, provision for adequate physical environment, and the control of standards of sanitation.

The laboratory animal veterinarian should establish and maintain those clinical services that are needed to expedite animal experimentation in the institution. This should include the examination, immunization, and treatment of incoming animals as well as those being held on long-term experiments, maintenance of

* Chairman.

animal blood banks, care of animals during the postoperative period, and necropsy services.

In summary, it has become evident that a laboratory animal medical unit can and should make an academic as well as a service contribution to its institution. The need for increasing our knowledge in comparative medicine and laboratory animal biology is great, and it is anticipated that great strides will be made in the area in the coming decade.

Letter to the Editor

Dear Doctor Bowers:

This is by way of commenting on your "A Poll of Our Readers" just in, and answering a letter from you dated Oct. 22, 1960, and held until some data were available. You may recall that I commented with some logic but not much judgment on your questionnaire about the journal. The logic I still uphold, but the judgment is rather deplorable in view of the unexpected change in editorial personnel and outlook which was even then taking place. A new editor surely is entitled to know where he stands with readers and authors as well as his own conscience and Board.

What you have chosen to extract from the poll is encouraging and interesting, though points of specific focus seem few enough so that they may well have been discouraging to you.

The Horowitz letter, together with comments by your Board, does seem to leave a need for some sort of counterbalance, however. Counterbalancing points no doubt exist in your own mind, but some members of the Board and surely many teachers in medical schools are only casually aware of the upheavals going on under the name of education. The professional educationist, as you know, is inclined these days to set himself up as *the* expert, to the extent that he resents intrusions by those who know their subjects and their students. He is the expert and he resents comments by laymen, thinking of himself as equivalent to a physician whose attitude toward lay or popular advice is certainly based on grounds vastly different from those of the educationist.

On the other hand, to assume that all educationists are extremists or that they have no ideas is hardly reasonable. But the danger is in acceptance of the educationists' claim that they are the experts, for in medicine there are so many complexities that the specialist gets an unusual hearing. A strong selling technique lies behind much in this realm, a technique to which the admirable words of Charles D. May on selling drugs (January issue of the journal) might well be reviewed.

Meanwhile, the few leaders in a sort of guerilla warfare against excesses, perhaps the Rickovers, the Bestors, and the Mortimer Smiths, representing the disorganized majority, also deserve a hearing. These men are closer to principles in medical education in one sense, at least. They would preserve subjects and experts in subjects, and surely no medical man wants to replace nephritis and broken bones with social adjustment, a preprofessional problem and a key in much that the educationist does. And medical men and students who will become such belong with those who can by experience deal with the broken bones.

Is it not likely that only those who have devoted an inordinate amount of time in attempts to contribute to medical education or to education as such will be sufficiently aware of the blandishments of the educationist to realize that, though their goal is the same as that of teachers, editors, parents, and the Rickovers, they represent only one set of ideas, and those often remote? It seems to me

that some sort of effort to preserve balance on the one hand and (you do imply this, but rather subtly) aloofness on the other is needed. If so, the efforts of the educationists to set themselves up as experts, regardless of the quality of ideas that might sometimes be picked up from them, should in some way be neutralized. The words "expert" and "authority" are dangerous in a world which, oddly enough, takes a man at his own word, though he is necessarily and obviously the most prejudiced man in the world relative to himself.

I hope that this comes under the heading, in your words, of "Constructive criticism will be even more welcome." Since my copies of the journal are passed around and do not come back, I cannot make a count, but I know that most of your articles are by genuine medical experts about their problems in medical education. May it so continue, carefully on guard in such places as the Miller seminars, the Horowitz letters, editorial columns, dangerously casual group decisions, and other places in which we see acceptance of the "ongoingness" and "togetherness" of enthusiastic bystanders who, perhaps with ideas and usually with good motives, are not the experts of education but the laymen of an organized movement.

As for the questionnaire, though I certainly stepped out of line with my clumsy feet, I still wonder if perhaps the most useful information might not be had from those who did not return the document.

Letters about editorials should not be longer than editorials. If you have come this far, thank you.

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ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

ANGELA SANCHEZ-BARBUDO, Ph.D.
Abstract Editor

General Practice in Canada and U.S.A.

H. J. CRONHELM, M.D. *British Medical Journal*, No. 5220, pp. 194-199. (Jan. 21), 1961.

In 1959 the author, a general practitioner in Belfast, visited the U.S. and Canada (under a Claire Wand Scholarship) in order to study at first hand conditions of general practice in these countries, as well as the opportunities offered general practitioners for postgraduate studies. Discussed in detail in this report are: the scope of practice in general; the field of obstetrics; family doctoring; hospital work; office accommodations and equipment, and ancillary office staff; also the scale of fees and the general practitioner's income; prepaid medical care plans, and the doctor-patient relationship. A special section is concerned with postgraduate education. In his conclusions, Dr. Cronhelm emphasizes that his main objective was to get an impression of what general practice is like "across the Atlantic," but that there surely were many things about Canadian and American practice which he did not discover and still ignores. While studying a variety of general practices, his tendency was to gravitate toward that of the larger centers of population. On the other hand, as to unavoidable comparisons, he does not claim to be an authority on general practice as carried on in the British Isles. Summing up his impressions, he states that the American general practitioners seemed to be fully occupied and

"were keen on their work," the principal reasons for which are seen in the fact that they feel they are fairly treated and properly rewarded for their efforts, and they are doing a worth-while job full of interest and challenge. Among the most satisfying aspects, the daily contact with colleagues in American hospitals is stressed, as well as the fact that all doctors, practitioners, and specialists alike treat each other as equals. The author praises the wisdom of most practitioners he met in not attempting procedures in excess of their competence, which proves, in his opinion, that "general practitioners can assume responsibility and will keep up to date and do good medicine" when they are fairly treated and provided with adequate working conditions. The satisfaction to admit one's own patients to the hospital under his own care is stressed as an advantage over the British system under which a general practitioner hands his patients over completely to a hospital colleague. It is also pointed out, however, that a lot of the apparent harmony in American medical practice must be due to the high demand for medical care which reduces competition among doctors.

The Characteristics of Rural and Urban Adolescents in Egypt. A. H. EL KOUSSY (Cairo). *Vita Humana*, Vol. 3, No. 4, pp. 219-226, 1960.

This is a report on the Conference held at the 16th International Congress of

Psychology, University of Bonn, in 1960 (Section: Differential Psychology of Adolescence). It refers to a preliminary study, originally intended to provide the basis for carrying out further research. One of its objectives was to find out whether there existed, in general, significant differences among adolescent groups before and after the ages of 15-16. The investigation was carried out through a questionnaire answered by 800 pupils of Cairo, Port Said, and rural areas. With more attention paid to the latter group, since they reflect more than others the traditional culture, the findings can be summed up as follows: (1) The urban groups show only very slight individual differences; they are almost similar to any other urban group. (2) A breakaway from the family starts earlier with boys than with girls, and earlier in urban than in rural areas. The moment of psychological emancipation, on the other hand, is difficult to determine and likely to follow a different trend. (3) On the whole, adherence to the family is a marked tendency, with both protective and domineering aspects. (4) There is, in general, high respect for older members of the community, especially for parents and relatives. (5) Self-evaluation was found to reflect more or less traditional standards shown by parents, preachers, and older people. It is influenced by the effort to obtain the approval of God in the first place, then that of parents, teachers, and the elders. Only after satisfying these traditional norms, standards can be derived from age-peers, and, finally, principles may be formulated by the youngster himself. (6) The feeling of having secured approval of God, parents, and teachers; the ownership of land, family cohesion, and the improvement of their economic condition, are found to be the main sources from which the rural youth derive their

security. The author (of the UAR Delegation, UNESCO) adds that it must be understood that, where material conditions undergo such rapid changes, the psychological changes will be slower to appear.

Les Etudiants de Médecine en U.R.S.S.

(Medical Students in the U.S.S.R.).

ANDRÉ PLICHET. *La Presse Médicale*, Vol. 69, No. 24, p. 1105 (May 20), 1961.

This is a brief report on Soviet regulations concerning admission to medical schools; number of students; examination systems; the ways of financing medical education, etc. The point is stressed that the number of students annually admitted to medical school is strictly limited in accordance with the statistical data concerning population growth; the number of practicing doctors (and that of doctors retiring each year); the needs of medical institutions, etc. Noteworthy is also the fact that *feldschers* and nurses, having already acquired some medical experience, are greatly encouraged to enter medical school and enjoy a certain priority (it was found that in Ukraine, in 1957, of a total of 5,000 students enrolled in medical schools, 2,000 were *feldschers* and nurses). On the whole, only a third of the yearly applicants to medical schools are actually admitted.

Une Enquête sur la Fatigue à Bord des "Jets" (An Inquiry on Fatigue on Board "Jets").

La Presse Médicale, Vol. 69, No. 24, pp. 1104-5. (May 20), 1961.

This extract from a paper read by Dr. Juin (medico-technical counselor of the French Syndicat National des Pilotes de Ligne) March 8, 1961, in Mexico City, at the annual Meeting of the International Federation of Air Line Pilots, reports on a medical in-

quiry, undertaken in 1960, on the abnormal fatigue experienced by navigators flying Boeing 707 planes for a length of time. The problem consisted in measuring the physical or psychological after-flight deterioration experienced by the jet navigator in comparison with the effects after an equivalent travail on conventional planes, and to evaluate its either passing or more deep-seated, but reversible, character, as well as the accumulation of effects and their tendency to irreversibility. The medical tests employed were (1) a clinical examination of heart, blood pressure, and pulsation reflexes, taking into account the age of the subject, the number of flight hours on conventional planes against that on jets; (2) a thorough biological examination; (3) an electro-physiological examination with the aid of Pluven and Guiot's electronic reothome; and (4) an ophthalmologic examination designed to check the nervous as well as the muscular fatigue.

Among significant results of the test inquiry the following are stressed: (1) Considerably greater fatigue, medically verified and measured, is experienced by the crew flying jets than is suffered, in equal conditions, by navigators on conventional planes. (2) The disorders observed run from reactions of physiological alarm to a state of total exhaustion, in the endocrine as well as in the metabolic domain. (3) Perturbations are found equally in the domain of oculo-motor equilibrium, in that of the visual convergence power, as well as in the domain of neuro-muscular excitability. (4) It appeared that recovery from these disturbances is slower and notably less complete for jet navigators than for those flying conventional planes, although the rest periods were identical for both. In discussing the causes to which the aggravation of

fatigue in jet pilots may be attributed (among them the altitude plays an essential role), a distinction is made between physical and psychological, or psychosomatic, factors.

A Study on Changes of Attitudes and Interests during Later Years of Life.

KLAUS F. RIEGEL and RUTH M. RIEGEL.
Vita Humana, Vol. 5, No. 4, pp. 177-202, 1960.

This study, aided by the Fund for Research in Psychiatry (New Haven, Connecticut), was conducted at the Institute of Psychology, University of Hamburg, Germany. Parts of the statistical analysis were done at the Mental Health Research Institute and at the Computing Center of the University of Michigan. Its final part was carried out during the tenure of a postdoctoral fellowship from the National Institute of Mental Health, U. S. Public Health Service. This report, in its introductory review of previous research on attitudinal changes during old age, discusses the work by Lewin, Kounin, Heglin, and Schaie, and the distinction between a "dogmatic" and a "rigid" attitude proposed by Rokeach, McGowney, and Denny (see detailed bibliographical references at the end of article). This distinction was used to construct two "attitude scales" consisting of, respectively, twelve and thirteen Likert type items. In addition, measures of the attitude toward life, referring to the subject's feeling toward his future and past, his own capacities and his value to society, and a scale on "adult interests" were applied to 380 subjects constituting a representative sample of the population of over 55 years of age in Northern Germany, as well as to a control group of 120 persons between 17 and 20 years old. The results indicate that "rigidity" and a negative attitude toward life increase

significantly with advancing age. The growth of rigidity must be attributed, mainly, to old people's predilection for expressing their opinions in form of general, stereotyped phrases. Its increase is slower and the means much lower when the questions were given in the first person singular. A similar distinction was made on the "dogmatism" scale, which shows a slight raise with advancing age, while the scale of adult interests remains very stable over the total age range. The data obtained have been analyzed by various statistical techniques. Inter-correlations of scales and sex differences have also been taken into account. Further study of the data by factor analytical techniques is planned, which will include various additional measures on intellectual and verbal abilities as well as on social background.

Some Observations on the Nutritional Status of Medical Students in the Brazilian Amazon. FRANK W. LOWENSTEIN, M.D. *American Journal of Clinical Nutrition*, pp. 870-874, (Nov.-Dec.), 1960.

The author reports on his observations, as a member of the U.S. Mission to Brazil (Point Four), of 133 medical students in the capital city of Belem. During the period from Sept., 1955 to Aug., 1956, these students were examined in regard to their nutritional status. Dietary information obtained from 104 students during 1 week showed a satisfactory to high mean intake of essential nutrients. The adequacy of these nutrients in the Brazilian diet was compared with N.R.C. recommended daily allowances, pointing out, however, that the Brazilians, being shorter and lighter in weight, have lower requirements than their North American counterparts. The incidence of physical signs associated with nutritional defi-

ciencies was found to be generally low, with the exception of such signs as the hypertrophy of the filiform papillae of the tongue; circumcorneal congestion of the eyes in men, and follicular hyperkeratosis of the skin in women, which might indicate an inadequate intake of vitamin A. Possible other than nutritional factors in the origin of these signs are also discussed. On the other hand, a high incidence of dental caries was found among the Brazilian students, especially severe among the male. The high sugar consumption among Brazilians does not explain this fact, since comparative groups of North American students with an equally high intake show a lower and less severe incidence of caries. Conditions of the gums were generally satisfactory, and incidence of simple goiter was low. It is pointed out that the diet pattern of the Brazilian medical student may be considered typical for the upper class of urban Brazil. It was found to be similar in various aspects to the diet pattern of a group of Chinese students in New York studied by the author in 1952-53.

Undergraduate Teaching of Otolaryngology. (Viewpoint of a Senior Medical Student.) JOSEPH B. SERRA. *Transactions. American Academy of Ophthalmology and Otolaryngology*, Vol. 64, No. 6, pp. 872-874. (Nov.-Dec.), 1960.

Mr. Serra, a senior student at Wayne State University School of Medicine, sent out 46 questionnaires to local chapter presidents of the Student American Medical Association. The 22 replies he received provide the basis for this discussion (although only 50 per cent replied, the author felt that they represent a wide enough variance of conditions in the several schools as well as the opinions of a significant portion

of individual medical students). Students were asked five questions: (1) How the teaching of otolaryngology and ophthalmology compared with that of other curriculum subjects; (2) whether they thought that inclusion of these subjects in the curriculum was justifiable; (3) what techniques seemed most valuable to the student; (4) whether they did learn to do a satisfactory examination of eye, ear, nose, and throat, and (5) whether the material was correlated with that of other medical study subjects. The answers received indicate that, according to the majority opinion, more time should be devoted to clinical experience and discussion of actual cases than to didactic lectures, which, it was felt, were often inadequately prepared; that learning to handle the basic instruments is important to the student and that this instruction should not be neglected by the teaching staff; that the time needed to cover the various courses in the curriculum is not available (therefore clinical experience in otolaryngology is an elective in some schools). Although there were specific complaints, the general opinion was that a student who had applied himself and taken advantage of the material presented, can adequately do the physical examinations pertinent to the two subjects.

Undergraduate Teaching of Otolaryngology. (Viewpoint of a Dean.) ROBERT B. HOWARD, M.D. *Ibid.*, pp. 875-77.

The dean of the University of Minnesota Medical School examines this subject from the point of view of the medical curriculum as a whole. First of all, he feels, all remnants of the old, finite concepts of medical training must be set aside, and medical education must be accepted "as an experience in true graduate education." With medicine as complex as it is today, what,

he asks, can we expect of our students in 4 years' time? Besides the fundamental vocabulary of their profession, they are expected to acquire a sound and thorough knowledge of the basic medical sciences; they also must receive a thorough indoctrination in the approach to clinical medicine and a knowledge of its basic principles, as well as of the services available from the various paramedical groups. The most important thing, however, in Dean Howard's opinion, is that they be "indoctrinated with curiosity, a spirit of inquiry, and a capacity for critical thought" to guide them through the rest of their professional career. In order to accomplish these objectives, some curriculum changes are being made at the Minnesota School of Medicine, which are briefly discussed in this article. They are geared to give more flexibility to the whole program; to have students participate to a greater extent in physical diagnosis, and to make clinical teaching a part of the whole. Specialty participation in this program will be carried out in such a manner that the relation of the specialty to the whole is made evident. As to ophthalmology and otolaryngology, the new program is expected to affect their teaching advantageously: there will be increased participation in physical diagnosis; lectures will be given every 2 years to the combined group of 3rd- and 4th-year students; clinical undergraduate teaching will take place largely through the out-patient department, and there will be a concentrated experience in these specialties for some students during the elective and/or free-time segments of the program, with the opportunity of spending perhaps as long as 3 months in ophthalmology or otolaryngology. A strong graduate and postgraduate training will of course be continued. Although the new approach

may result in some students' having less time in otolaryngology and ophthalmology than formerly, others will get a much longer and more meaningful experience in these areas. This, it is pointed out, would recognize the fact that all students do not get exactly the same "exposure" during their undergraduate years, and this is entirely compatible with the concept of medical education as a continuum.

Medicine and Public Health in a New Era. W. K. Kellogg Foundation, Annual Report, pp. 51-66, 1960.

Any long-range planning to advance our medical education system must be based upon the comprehensive study of the administration, financial structure, curricula, research, and medical services of the nation's 86 medical schools. The Kellogg Foundation, as this report points out, has given continued support to the "fact-finding" activities of the Association of American Medical Colleges. In order to solve eventually a series of problems afflicting medical education, the Association has been investigating, with the aid of the Foundation, some questions pertinent to the training of the physician as an undergraduate student and later as a practitioner. Data have been gathered—through questionnaires, interviews, visits to medical centers, etc.—on, among others, the following questions: What factors encourage or discourage students from selecting, or remaining in medicine as a career? What are the objectives, the educational values, and the relationships of the medical internship to the hospital? What can be done to alleviate faculty shortages in medical schools? What does it actually cost to operate an existing medical school, and what would it cost to construct and operate new medical facilities? (the results of such data analyses and infor-

mational services are provided to medical schools through "Datagrams," with the Association serving as a clearing house). A few of the principal Foundation supported studies carried out recently by the Association are discussed briefly in this report, such as the one concerned with assessing the educational quality of the medical school-controlled internship (this subject having long been a controversial issue), or with the extent to which financial problems do actually interfere with an adequate supply of medical students. Other studies mentioned center on various facets of the problem of how to secure adequate teaching staff, or on curriculum reforms. Also through Kellogg Foundation funds, a series of regional conferences of medical school administrative personnel have been held, in order to review procedures for initiating a simplified cost study plan. Subsequent to these conferences, the Association is developing a method for comprehensive analysis of medical college financing, with the goal to attain uniform accounting, budgeting, and fiscal terminology. The objectives of Association studies include also the provision, to communities interested in the establishment of new medical schools, of data on the many complex factors involved. A partial solution to the urgent problem of medical school expansion is seen in the revival of the idea, put forth some years ago, to establish schools of basic medical sciences (three are now in existence) to encompass the first 2 years of the medical curriculum; existing hospital facilities in many communities would be adequate for this purpose. This plan could add significantly to the number of medical students, and so far no complications are foreseen with respect to the later transfer of these students to the traditional 4-year schools. Among the other

various programs to further medical education, supported by the Foundation, is the assistance to medical training in Latin America—a very important part of which is the program providing U.S. study and observational experiences for the advanced training of selected medical faculty members. Excellent results of this effort can be seen already in the establishment of new teaching programs of great significance to the progress of medical education in Latin America.

The Yale School of Medicine in the Twentieth Century. VERNON W. LIPPARD. *The Yale Journal of Biology and Medicine*, Vol. 33, No. 3, pp. 184-92, (Dec.), 1960.

On the occasion of its 150th Anniversary, the history of Yale School of Medicine is reviewed by Dean Lippard. The School, which stood among the best in its early days, had been lagging behind at the turn of the century because it had been poorly supported, morally and financially, by the University. In 1910, at the beginning of the renaissance of medical education in America, it was at a low ebb. At that date, however, a turn for the better began when George Blumer, a physician with national reputation and a clear vision of the University's future role in medical education, was appointed dean of the medical school. Through the continuous appointment of the right men in the right place at the right time, and a series of drastic reforms, the school moved forward, and by 1934, Dr. Welch could say that "there is nothing in modern medical education so remarkable as the recent transformation of the Yale School of Medicine from the old type into a modern medical school." Among the factors which helped to bring about this transformation, the significance of the Brady gift, which

built the Brady Memorial Laboratory in 1917, and of other gifts for endowment is stressed. An important event is seen in the construction of its medical library, which opened in 1941. A major strength of the school over the past 35 years, it is pointed out, has been the consistency of its educational policy. At a time when the status of the school was such that any deviation from the standard pattern of medical education would have been viewed with suspicion, Yale's medical faculty had the vision and courage to embark upon a program which differed from that of any other medical school. The fundamental concept was, and still is, that medical students are *graduate* students and should be treated accordingly. Lectures, at Yale, are confined to the discussion of material not readily found in textbooks, and instruction in small conference groups with active student participation is emphasized. Interest in scientific inquiry is stimulated by providing opportunity for original research under the close supervision of experienced investigators. Examinations in courses have been abolished and are being substituted by examinations on completion of the preclinical and clinical years. On the whole, the study of medicine at Yale, Dean Lippard feels, has been organized "so that it follows a logical sequence from normal structure and function, to deviation resulting from internal and environmental influences, to application of this knowledge to prevention, diagnosis, and therapy. Although a complete evaluation is difficult, there are certain indices which point to the success of the Yale medical education policy. Comparison, for instance, of the achievements of Yale students with all the students in the U.S. who have taken examinations of the National Board of Medical Examiners shows that the average score of

Yale students is invariably at, or near, the top of the list. An analysis of the achievement of Yale medical graduates over the period from 1928 through 1952 shows also that a surprisingly large number have continued successfully their interest in teaching and research. Yale scientists, it is further pointed out, have contributed to every important advance in medical science which has taken place in recent years. At the same time, it has been possible for the

School to keep a reasonably good balance of emphasis on instruction, research, and, in the clinical departments, on service. However, in view of the explosive growth in research activity everywhere, Dr. Lippard is concerned with the threat that this balance might be lost in the future. Other problems and challenges with which the Yale School of Medicine is faced as it enters its 151st year are also briefly discussed.

NEW BOOKS

KENNETH E. PENROD

Book Review Editor

Reviews

Britain's Search for Health. By PAUL F. GEMMILL. Philadelphia: University of Pennsylvania Press, 1960. 171 pp.

Several years ago, a melancholy candidate for the United States presidency wrote a magazine article about a cheerful London "Grannie" who died of pneumonia because a bed could not be found for her in the crowded London hospitals. The London hospitals were crowded because the beds were filled with malingerers or patients with trivial illnesses demanding care as a government right. This ridiculous story was probably believed only by the most credulous Americans, but it irritated the British.

One British author noted that they often were unable to recognize their health service from the descriptions of it in American publications. Professor Gemmill's position with respect to the National Health Services coincides with the usual position of informed British opinion; to wit: (1) the service is a good service; (2) it is very popular with the British public, and (3) there are many problems remaining to be solved.

This very informal little book is based upon a wealth of reading, conversations with scores of British doctors and scholars, and an informal survey of doctors and patients in the United Kingdom. It touches upon most aspects of the service. There are descriptions of its origins, how it works, how it is paid for, how it has affected the doctors, etc. Much attention is given to the problems and criticisms of the health service. The views of both its critics and proponents are aired.

The American visitor in Great Britain will occasionally hear Britains say that an illness in the United States means bankruptcy. American opinions about Britain are often just as fanciful. Books like Pro-

fessor Gemmill's are needed. Although this book is not a whodunit, it is extremely readable, in contrast to much of the turgid prose that flows from the university presses. The medical educator who reads it will have the double pleasure of informing himself and enjoying some competent writing.

Teaching and Learning in Medical School.

By GEORGE E. MILLER, STEPHEN ABRAHAMSON, IRA S. COHEN, HAROLD P. GRASER, ROBERT S. HARNACK, and ADELLE LAND. Cambridge: Harvard University Press, 1961. 296 pp. \$5.50.

Most medical educators are familiar with the experiments in medical teaching begun at the University of Buffalo several years ago. After a relatively informal beginning, wherein a group of interested teachers gathered to discuss teaching and learning concepts, the program grew into a more formalized project and came to be called the Project in Medical Education. With the encouragement and support of the Commonwealth Fund this continued for 5 years. During this period nearly 100 medical faculty members representing most of the major basic and clinical disciplines, and a score of medical schools, participated in one or more of the Project activities. Later this program evolved into the continuing Summer Seminars on Medical Teaching under the sponsorship of the Association of American Medical Colleges.

This book is the outgrowth of this experience. It is not designed to document the background and evolution of the Project in Medical Education, or to present and analyze data which led to the conclusion that it was successful. It is a straightforward exposition of those things which this experience has shown to be most useful to the teacher faced by an expectant medical student or a group of them. It is intended as a source book for those who want to know more about ways in which con-

temporary concepts of teaching and learning might be put to use in a medical school. The point of view is frankly partisan and designedly provocative. It is the purpose of the authors to strengthen pedagogy already good, to salvage techniques which could serve more usefully, to point out principles and practices that have not yet found their way widely into medical schools.

The book consists of four sections, each intended to amplify one of the factors which contribute to the climate for learning and which influence its quality. The first section deals with the medical student, with emphasis on his selection and environment. The second section focuses on "The Process of Learning." The third section deals with "The Tools of Instruction," while the fourth section deals with "The Evaluation of Learning."

Whereas any challenge to his teaching techniques, either frontal or by indirection, bring forth violent reaction from some medical educators, there are those who are willing to admit that specialists in the field of teaching and learning may have something to contribute to medical education. It is to the latter that this book is directed, with a plea of forbearance by the former.

Considerable shake-down has occurred in this subject over the past decade, largely brought about by this group. The appearance of this text is timely, and the book is worthy of the consideration of all medical educators.

Biological Education in American Secondary Schools, 1890-1960. Biological Sciences Curriculum Study Bulletin Number 1. By PAUL DEHART HURD. Washington, D. C.: American Institute of Biological Sciences. 263 pp. \$4.75.

The Biological Sciences Curriculum Study, with major financial support from the National Science Foundation, is one of the principal educational programs of the American Institute of Biological Sciences. The Curriculum Study, shortly after its organization in January, 1959, established headquarters on the campus of the University of Colorado. The BSCS steering committee, focused the immediate attention of

the study on the secondary school curriculum in biology. The author of the present work was invited to make a thorough study—both historical and critical—of the development of secondary school biological education in the United States.

This is the first in a projected series of Bulletins which will be concerned with basic developments and problems in science education and all levels with special reference to the biological sciences.

The present study is limited to a consideration of curriculum development and investigations of classroom and laboratory learning. Teacher education, professional training of biologists, and special programs for high school students are not considered. This study provides a historical perspective, a digest of research, and interpretive summaries about biology teaching that should prove useful to those engaged in the improvement of the high school science curriculum.

The book is divided into two parts. The first part involves critical analysis of some 84 committee reports available from all over the United States. Part II (chapter 9 through 16) is a digest of 159 individual research studies on the subject published in the literature. A full bibliography, both of the committee reports and of the research studies, is included.

Hospitals, Doctors, and Dollars. Reports and opinions on our Good Samaritans, who are having some bad times. By ROBERT M. CUNNINGHAM, JR., New York: F. W. Dodge Corporation, 1961. 268 pp. \$6.95.

These collected anecdotes and episodes have, for the most part, previously appeared at one time or another in *The Modern Hospital*, a monthly magazine of which the author of this book is editor. Some of the pieces appear just as they appeared originally in the magazine; others have been revised and brought up to date. New and old alike, the articles deal more often with failure than with success, and the comments and opinions are more likely than not to be critical. The author writes with an insider's knowledge but with an outsider's point of view. He neither attacks

nor defends the hospital institution and its activities; he merely attempts to describe the symptoms and comment on their significance.

Many of these articles deal with the public relations of doctors and hospitals. However, the coverage is broad and presented in a highly entertaining style. This book will be enjoyed by physicians, hospital personnel, and laymen alike.

Abstracts

Heredity in Ophthalmology. By JULES FRANCOIS. St. Louis: The C. V. Mosby Company, 1961. 705 pp. \$23.00.

The original French edition of this book was published in 1958 and has been translated into English by its original author. The author points to a marked increase in recent years in congenital and heredity abnormalities in the visual apparatus of children. It is for this reason that he has focused on the genetic make-up contributing to the development of the constitution of the individual. The book is divided into four parts entitled: General Genetics, Genetics in Ophthalmology, The Heredity Diseases of the Eye, and General Diseases with Ocular Manifestations.

Abdominal Operations. By RODNEY MAINGOT, with special articles by 36 British and American contributors. 4th ed. New York: Appleton-Century-Crofts, Inc., 1961. 1367 pp. \$29.50.

Six years have elapsed since the third edition of this work, so it has been necessary to revise the whole work thoroughly and drastically in order to bring it up to date, to reset it entirely, to add several new chapters and delete others, to introduce 917 fresh new illustrations depicting the important steps in operative procedures, and to invoke the aid of eminent contributors in order to insure that certain specialized subjects in this vast field should receive expert consideration. This book is intended to present a detailed account of abdominal operations as practiced today. It also deals with the choice of operations, the difficulties and dangers which sometimes arise during the conduct of operation,

the preoperative preparation and the post-operative care of the patient, the management of complications, the immediate and remote result of the various measures described, the clinical, radiological, pathological, and other aspects of lesions of the abdominal viscera, and many problems in abdominal surgery. It is written for the abdominal surgeon, resident surgeons, surgical registrars and assistants, and those holding responsible posts on the staffs of hospitals, as well as undergraduates studying for higher degrees in surgery and all interested in present-day developments in surgery.

The Cardiac Arrhythmias. A Guide for the General Practitioner. By BRENDAN PHIBBS. St. Louis: The C. V. Mosby Company, 1961. 122 pp. \$7.50.

This book is written to teach physicians who are not cardiologists to diagnose and treat cardiac arrhythmias. Such diagnosis involves two skills—electrocardiographic interpretation and clinical or "bedside" diagnosis. The former is simple and very accurate. The latter is often difficult or impossible. The book is organized along the following lines: After an initial review of basic anatomy and physiology, figures are used to illustrate the sequence of events in normal and abnormal heart mechanisms. Electrocardiographic representation of the activation of the heart is described in detail. Each arrhythmia is illustrated by numerous electrocardiograms. At the end of the book some exercises for practice are included. Clinical features are described when relevant or helpful. Therapy for each arrhythmia, with dosages and exact procedures, is outlined.

Radioactivity in Man. Whole-Body Counting and Effects of Internal Gamma Ray-Emitting Radioisotopes. A symposium held at the Vanderbilt University School of Medicine. Edited by GEORGE R. MENEELY with 48 contributors. Springfield, Illinois: Charles C Thomas, 1961. 445 pp.

This symposium was held on April 18 and 19, 1960, and was sponsored by the Section on Medical Sciences of the American Association for the Advancement of Sci-

ence. The individual chapters of this record of the symposium constitute a comprehensive presentation of present knowledge of the principles and techniques of low level whole-body gamma-ray spectrometry. They take into consideration implications of the radiological, medical, sociological, and legal problems arising from small and increasing burdens of radioactivity in human beings. Effects of radioactive fallout are discussed in detail—its nature and potential hazards to those occupying a fallout area. This is an excellent source book for a wide range of readers. Much space is devoted to instrumentation—its possibilities and limitations. Attention has been focused on problems of calibration, the location of the isotope in question within the body, questions of absorption, and the thorny matter of adequate reference standards.

Histology. By ARTHUR W. HAM and THOMAS SYDNEY LEESON. 4th ed. Philadelphia: J. B. Lippincott Company, 1961. 924 pp. 589 illustrations. \$11.00.

This edition of a now well known book continues the two major aims of its predecessors which are: not only to explain the subject matter of histology as simply, clearly, and as interestingly as possible, but also to help the student to become a good histologist; second, to explain the significance of histology. In recognition of the fact that modern histology is so integrated with other biological sciences that it can no longer be taught effectively by a scientific isolationist, this book is designed to teach not only the primary function of histology but also to introduce the student to enough of the subject matter of related disciplines to integrate, so far as possible, structure at all microscopic levels with physiological and biochemical activities. Accordingly, much of the book has been rewritten or extensively revised. Finally, this book carried for the first time with this edition the name of a co-author, Dr. T. S. Leeson.

Medical Pharmacology. Principles and Concepts. By ANDRES GOTH. St. Louis: The C. V. Mosby Company, 1961. 522 pp. \$11.00.

It is the aim of this book to present current pharmacologic knowledge with particular reference to principles and concepts. Essential facts about important drugs are included, but a great saving is effected by eliminating a repetitious discussion of compounds which have little practical or theoretical importance. The book is written primarily for students and practitioners. It is meant to be a book of relatively modest size containing the elements of pharmacology which students of medicine need for their future growth.

The Human Adrenal Gland. By LOUIS J. SOFFER, RALPH I. DORFMAN, and J. LESTER GABRILOVE. Philadelphia: Lea & Febiger, 1961. 578 pp. \$18.50.

This book is aimed at the elucidation of the anatomy, physiology, and chemistry of adrenal hormones, and the diagnosis and treatment of diseases of the adrenal glands. Emphasis is on the clinical aspects, but theoretical as well as practical viewpoints are included. All the known adrenal hormones, including medullary and cortical, and the synthetic analogues, are considered.

Electron Microscopy in Anatomy. Edited by J. D. BOYD, F. R. JOHNSON, and J. D. LEVER. Baltimore: Williams & Wilkins Co., 1961. 286 pp. \$10.00.

A meeting of the Anatomical Society of Great Britain and Ireland was held in London in April, 1959, and devoted to the topic "The Ultrastructure of Cells." This volume represents the proceedings of this symposium and includes all but two of the papers which were read. In all, twenty papers are contained in this volume, and many include excellent illustrations.

72ND ANNUAL MEETING
OF THE
ASSOCIATION OF AMERICAN MEDICAL COLLEGES

Queen Elizabeth Hotel
Montreal, Canada

November 13-14, 1961

INFORMATION

Hotel

It is important that requests for hotel reservations be made directly to the Queen Elizabeth Hotel in Montreal, Canada and not through agencies or hotels in other cities.

Your cooperation is requested in sharing a double room with another member if possible and in notifying the hotel to this effect.

Tickets for the Annual Banquet, Monday evening, Nov. 13, may be purchased at the time of registration, as this will not be included in the European Plan at the Queen Elizabeth Hotel.

Registration

The Registration and Information Desk will be open from Friday, Nov. 10, through Tuesday, Nov. 14.

Women's Activities

Information regarding planned activities will be available at the Ladies Registration Desk.

PRE-CONFERENCE MEETINGS

Friday, November 10, 2:00 P.M.-5:00 P.M., and Saturday, November 11, 9:00 A.M. until 12:00 noon, the Fifth Annual Meeting of the Continuing Group for Student Affairs. *Limited to Section Members.*

Saturday, November 11, 9:00 A.M.-5:00 P.M., and Sunday, November 12, 9:00 A.M. until 12:00 noon, the Medical School-Teaching Hospital Section of the Association. *Limited to Section Members.*

Saturday, November 11, 9:00 A.M.-12:00 noon. *Open meeting:* Central and South American Deans and Medical Educators. 2:00 P.M.-5:00 P.M. *Closed meeting:* Central and South American Deans and Medical Educators.

Sunday, November 12, 9:00 A.M.-12:00 noon. *Closed meeting:* Central and South American Deans and Medical Educators. 2:00 P.M.-5:00 P.M. *Open meeting:* Central and South American Deans and Medical Educators.

PROGRAM—72ND ANNUAL MEETING

Monday, November 13

Dr. George N. Aagaard, Presiding

- 9:00 A.M. Statement of Welcome—President, Association of Canadian Medical Colleges
Introduction of New Deans and Presidential Address, George N. Aagaard, M.D., Dean, University of Washington School of Medicine, Seattle
- 9:30 A.M. Topic and Speaker to be announced.
- 10:15 A.M. "An Inquiry into Medical Teaching"—George E. Miller, M.D., Director of Research in Medical Education and Professor of Medicine, University of Illinois College of Medicine
- 10:40 A.M. "Seminars on Medical Teaching; A Recapitulation"—Edwin F. Rosinski, Ed. D. Associate Professor of Medical Education and Director, Office of Research in Medical Education, Medical College of Virginia
- 11:05 A.M. Panel discussion, "Flexibility in the Time for Preparation of the Physician"—John A. D. Cooper, M.D., Chairman; Associate Dean, Northwestern University Medical School
- Robert H. Alway, M.D., Dean, Stanford University Medical School
- Samuel P. Asper, Jr., M.D., Associate Dean and Chairman of Admissions, Johns Hopkins University School of Medicine
- 12:00 NOON Luncheon

NOVEMBER 13

Monday Afternoon

Dr. Stanley W. Olson, Presiding

- 2:00 P.M. "A Four-Year Integrated Curriculum in Radiobiology"—William H. Elliott, Ph.D., Professor, Department of Biological Chemistry, St. Louis University
- 2:25 P.M. "Developments in High School Biology and Their Implications for Medical Education"—Lester J. Evans, M.D., Director, New York University Center for Rehabilitation Service and Arnold Grobman, Ph.D., Director, Biological Sciences Curriculum Study, University of Colorado, Boulder
- 2:50 P.M. "Medical Education at Western Reserve University; A Progress Report"—T. Hale Ham, M.D., Professor of Medicine and Director of the Division of Research in Medical Education, Western Reserve University School of Medicine

- 3:15 P.M. Panel discussion, "Problems of Admission and Liaison Pertaining to Medical Colleges, Secondary Schools, and Undergraduate Institutions"
Clifton W. Emery, Ph.D., Chairman; Dean of Men and Chairman, Pre-Medical Advisory Committee, College of Liberal Arts and Engineering, Tufts University
Daniel H. Funkenstein, M.D., Assistant Professor of Psychiatry, Harvard Medical School; Director of Research, Harvard University Health Services
Calvert W. Bowman, Head of Guidance and Counseling, San Mateo High School, San Mateo, California
Harold W. Bailey, Ph.D., LL.D., Associate Dean, College of Liberal Arts and Sciences, University of Illinois, Chicago Undergraduate Division
- 4:30 P.M. Open Hearings on Annual Reports of Committees
Animal Care
Audio-Visual Education
Continuation Education
Editorial Board
Federal Health Programs
International Relations in Medical Education
Internships, Residencies and Graduate Medical Education
Licensure Problems
Medical Care Plans
Medical Education for National Defense
Medical School Architecture
Medical School-Affiliated Hospital Relationships
Research and Education
Veterans Administration-Medical School Relationships

NOVEMBER 13

Monday Evening

- 7:00 P.M. Annual Banquet of the Association
Presentation of the Borden Award in the Medical Sciences for 1961—S. Marsh Tenney, M.D., Chairman, Committee on the Borden Award; Dean, Dartmouth Medical School
Presentation of the Abraham Flexner Award for Outstanding Service to Medical Education—Joseph C. Hinsey, Ph.D., Director New York Hospital-Cornell Medical Center
Fourth Alan Gregg Memorial Lecture, "The Epic of Alan Gregg"
Wilder G. Penfield, O.M., M.D., F.R.S., Guggenheim Fellow, Montreal Neurological Institute, McGill University, Montreal

NOVEMBER 14

Tuesday Morning

Dr. George N. Aagaard, Presiding

- 9:00 A.M. Introduction of Foreign Visitors
9:10 A.M. "Medical Education in Latin America Today"—Abraham Horwitz, M.D., Director, Pan American Sanitary Bureau, Regional Office of the World Health Organization

- 9:40 A.M. "The World Role of the Association of American Medical Colleges"—H. van Zile Hyde, M.D., Director, Division of International Medical Education, Association of American Medical Colleges
- 10:05 A.M. "Educational Costs in Teaching Hospitals"—Howard Bost, Ph.D., Assistant Vice President for Policy and Planning, University of Kentucky College of Medicine
Mr. Augustus J. Carroll, Business Officer, State University of New York, Upstate Medical Center, Syracuse
- 10:55 A.M. "Hospital Community Planning, Teaching Hospitals, and Medical Schools"—Karl S. Klicka, M.D., Executive Director, Hospital Planning Council for Metropolitan Chicago
- 11:20 A.M. "The Revised Part III Examination of the National Board and its Results"—John P. Hubbard, M.D., Executive Director, National Board of Medical Examiners and Professor of Public Health and Preventive Medicine, University of Pennsylvania School of Medicine

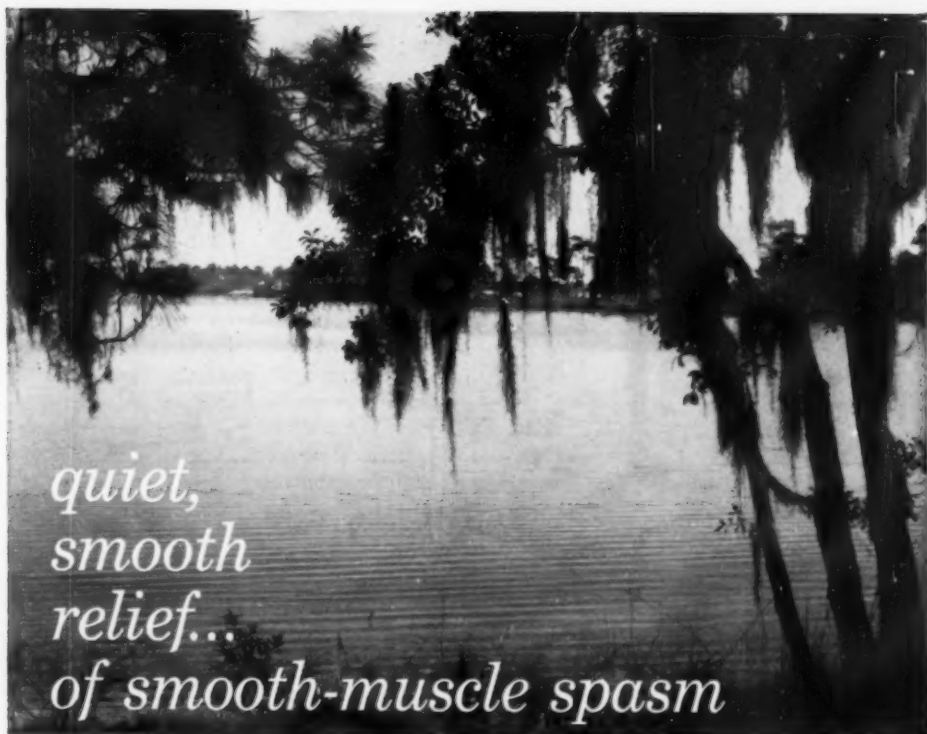
NOVEMBER 15

Dr. George N. Aagaard, Presiding

9:00 A.M.

through Business Meeting of the Institutional Membership (Deans or their designees)

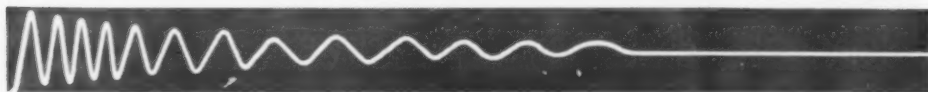
5:00 P.M.



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of smooth-muscle spasm*

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MEDICAL EDUCATION NEWS

from the Medical Schools

Albany

Four associate professors in the department of medicine have been promoted to full professors. They are: Dr. JAMES H. CULLEN; Dr. JOSEPH T. DOYLE, head of the sub-department of cardiovascular medicine; Dr. KENNETH B. OLSON, head of the sub-department of oncology; and Dr. LEONARD D. POLICOFF, medical director of the division of physical therapy.

Dr. JOHN K. MILLER, principal medical bacteriologist in the Division of Laboratories and Research of the State Health Department, N.Y., has been named to head the sub-department of infectious diseases at Albany Medical Center. In conjunction with his new post, Dr. Miller has been appointed associate professor of medicine at the Medical College and attending physician at Albany Medical Center Hospital.

Boston

Dr. ALEXANDER G. MATOLTSY, newly appointed full research professor, will head a new laboratory for dermatology research in the Boston University-Massachusetts Memorial Hospitals Medical Center. Working with Dr. HERBERT MESCON, chairman of the dermatology department at the School of Medicine, Dr. Matoltsy will also aid in the university's dermatology research training program under a \$40,000 grant from the Public Health Service.

Housed in Boston University's new \$3

million medical research building, the laboratory is equipped for the preparation, preservation and microscopic study of skin tissue. An electron microscope will be added.

Bowman Gray

September 10th marked the 20th anniversary of the Bowman Gray School of Medicine. A banquet commemorating the occasion was held Sept. 9, with Dr. WARD DARLEY, A.A.M.C. Executive Director, as principal speaker.

Creighton

A gift of undisclosed size, but termed by university officials as "by far the largest ever made to Creighton" will be used to erect a new medical center. The donor is Mrs. Mabel L. Criss, widow of Dr. C. C. Criss, founder of Mutual of Omaha and United of Omaha and a 1912 graduate of the Creighton University School of Medicine. Construction is expected to begin sometime in 1962. The new Medical Center will contain research and office facilities, an out-patient department, a classroom-laboratory building, and will also house the School of Pharmacy.

Duke

Dr. F. STEPHEN VOGEL has been appointed professor of pathology in charge of neuropathology. He came to Duke from Cornell University Medical College where he was a member of the pathology

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faculty and director of the neuropathology laboratory of the New York Hospital.

Dr. ROBERT L. HILL has been named associate professor of biochemistry. Before joining the Duke faculty, he was an associate research professor at the University of Utah.

Dr. R. FREDERICK BECKER has been given a key responsibility in developing a new medical school in the Far East. A member of the Duke anatomy faculty, Dr. Becker will leave for Thailand early in October under assignment from the International Cooperation Administration of the U.S. State Department. During a two-year leave of absence he will head the organization of the anatomy department in the Medical School of Chiang Mai. The school is now being established in northwestern Thailand near the Burma border.

A center for cystic fibrosis treatment, research, and training will be established at the Medical Center with financial support from the National Cystic Fibrosis Research Foundation. Duke has been awarded an initial eight-month grant of \$14,000 by the Foundation to support this undertaking, and future support is anticipated. Dr. ALEXANDER SPOCK of the pediatrics faculty will head the new center.

New facilities marking a forward step in providing greater care for infant and child patients at the Duke University Medical Center have just opened. An addition to Howland children's ward has increased the number of pediatric beds from 33 to 50.

Harvard

Dr. FRANCIS D. MOORE, Moseley professor of surgery, and surgeon-in-chief of the Peter Bent Brigham Hospital in Boston, was honored Sept. 7, by the National University of Ireland. In ceremonies held at Iveagh House, St. Stephen's

Green in Dublin, Dr. Moore received the honorary degree of Master of Surgery. The biennial meeting of the International Society for Surgery was held that week in Dublin, and the honorary degree ceremonies took place during the meeting.

Illinois

Dr. MELVIN SABSHIN has been appointed head of the department of psychiatry. He is currently associate director of the Institute for Psychosomatic and Psychiatric Research and Training at Michael Reese Hospital in Chicago.

Dr. WILLARD VAN HAZEL, clinical professor of surgery at the College of Medicine and senior thoracic surgeon at Presbyterian-St. Luke's Hospital, died of a heart attack Aug. 24 at age 65.

Iowa

Dr. ADRIAN E. FLATT, associate professor of orthopedic surgery, has been awarded a Hunterian Professorship in the Royal College of Surgeons of England. Although Dr. Flatt will assume the Hunterian "chair" only during the day he delivers his lecture in England, he will be entitled to use the term "Hunterian Professor" on all official occasions and publications for the rest of his life. Dr. Flatt's report on "Surgical Rehabilitation of the Rheumatoid Hand" will be delivered June 14, 1962 in the Great Hall of the Royal College of Surgeons in London. The professorships are named after John Hunter (1728-1793) who has been ranked as one of the three most influential surgeons of all times and who was the founder of experimental and surgical pathology.

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Recommended Daily Dietary Allowances, Revised 1958, Food & Nutrition Board, National Academy of Sciences—National Research Council.

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been given a \$115,000 grant by the W. K. Kellogg Foundation to aid in the construction of a new research laboratory. The building will provide facilities for research into the causes and treatment of blinding ocular diseases by members of the faculty and staff of the School of Medicine and the Johns Hopkins Hospital.

Loma Linda

WM. FREDERICK NORWOOD, Ph.D., has been named assistant dean of the School of Medicine and chairman of the division of postgraduate medicine. He fills the post formerly held by Dr. G. E. NORWOOD, who was forced to resign because of illness. Dr. W. F. Norwood recently returned to the school, having spent a year and a half at the American Medical Association where he conducted research for the development of their newly organized scholarship program.

Marquette

Dr. GILBERT F. HAMILTON of Aberdeen University, Scotland, has joined the Marquette faculty and will spend the academic year as visiting professor of anatomy. Dr. Gilbert has been senior lecturer in anatomy at Aberdeen University since 1947 and has been a member of the faculty since 1939.

Miami

Miami's Board of Trustees has approved the first stage of a planning program for the development of teaching facilities of the school of Medicine adjacent to the Medical Research Building at Jackson Memorial Hospital. As outlined, the plan calls for abandoning the present facilities in Coral Gables and construction of an educational wing at Jackson containing some 230,000 square feet at an estimated cost of upwards of \$9 million, including equipment. An addi-

tional \$9 million will be needed as endowment for maintenance and repairs.

Michigan

Work is now underway on three construction projects totalling \$4,050,000 at the University of Michigan Medical Center. Involved is the expansion of the physical medicine department and modernization of central services in University Hospital, a joint project costing \$1.8 million; erection of the \$1,750,000 Kresge Hearing Research Institute attached to the present Kresge Building; and creation of a \$500,000 Clinical Research Unit on the ground floor of the hospital.

The Clinical Research Unit will include a six-bed section for intensive study of metabolic disorders, a 14-bed general research area, and laboratory facilities. Government funds will be used to create the Unit.

Plans for the Hearing Research Institute were launched a year ago with an initial grant of \$200,000 from the Kresge Foundation. Target date for completion of this building is September, 1962.

New York University

Cornerstone ceremonies for the new University Hospital of New York University Medical Center were held Sept. 28, with the Honorable ABRAHAM A. RIBICOFF, Secretary of HEW as principal speaker. The 18-story structure will contain 600 beds and extensive out-patient and research facilities. Completion is scheduled for the fall of 1962.

Northwestern

The university will offer this fall a curriculum in biomedical engineering. Medical specialists and electrical engineers will work together to improve the practice of medicine through the use of electrical theory and electronic instru-

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Ohio State

Two hospitals in the Ohio State University Health Center that have been under direct state control have been transferred to the College of Medicine by the Ohio General Assembly. They are the Columbus Psychiatric Institute and Hospital, one of the original Health Center Hospitals opened in 1951, and the newly constructed \$1.5 million Ohio Rehabilitation Hospital. The Psychiatric Institute will continue as a special facility for the treatment of selected patients from anywhere in the state of Ohio. When a new research wing now under construction is completed in the early part of 1962, the Institute will operate as a neuropsychiatric hospital in which neurological and psychosomatic activities will be augmented. The Rehabilitation Hospital will operate as a special facility for select patients disabled by industrial accident, other accidents and disease.

Among the 38 faculty members who were given promotions recently, six were awarded full professorial rank. Newly appointed professors are: Dr. JOHN A. EGLITIS, department of anatomy; Dr. COLIN R. MACPHERSON, department of pathology; Dr. BERNARD H. MARKS, department of physiological chemistry and pharmacology; Dr. WILLIAM MOLNAR and Dr. THOMAS C. POMEROY, department of radiology; and Dr. WILLIAM S. SMITH, department of surgery and chief of the division of orthopedic surgery.

Oklahoma

An Institute of Environmental Health will be established at the Medical Center with \$81,500 contributed by ten industrial firms. Dr. CARL A. NAU, former professor and chairman of preventive medicine and public health at the University of Texas Medical Branch (Galveston), will direct the Institute. Occupational health will be taught medical students, practicing physicians, engineering students, and others "with an interest in the impact of man's environment—physical, biological and social—on health."

Rochester

Dr. ASER ROTHSTEIN, professor of radiation biology at the Medical School, has been appointed associate director of the University of Rochester Atomic Energy Project and vice chairman of the department of radiation biology. Dr. HENRY A. BLAIR is director of the AE Project and of the radiation biology department. Dr. Rothstein has just returned from the fifth International Congress on Biochemistry in Moscow where he delivered a paper.

As president of the International Society for Cardio-Vascular Surgery, Dr. CHARLES ROB, chairman of the surgery department, presided at the society's fifth annual international congress Sept. 7-9 in Dublin, Ireland. He received an honorary degree of Master of Surgery from Trinity College, Dublin, and was made a fellow in the College of Surgeons of the University of Dublin.

Stanford

A clinical radiotherapy cancer research center will be established at the Stanford Medical Center this fall under a \$943,412 grant from the National Cancer Institute. It is estimated that between 200



Boys in White

Student Culture in Medical School

by Howard S. Becker, Blanche Geer, Everett C. Hughes and Anselm Strauss. A team of well known sociologists produced this informative study through participant observations of medical students in daily classes and at work in hospitals and laboratories. The students' opinions, frequently quoted, enliven this report about their conception of the medical profession, its ideals and practicalities. A book of special interest to medical and general educators, and sociologists. \$10.00

The Mentally Disabled and the Law

edited by Frank T. Lindman and Donald M. McIntyre, Jr. The first treatise to determine and evaluate on a nation-wide basis the rights of the mentally disabled person. This broad five-year study by the American Bar Association is written for lawyers, psychologists, hospital administrators and social workers. Chapters include historical trends, involuntary and voluntary hospitalization, release from mental institutions, the rights of the hospitalized patients, eugenic sterilization, incompetency, property rights, criminal "insanity" or irresponsibility, and psychopathy. Tables compare relevant laws of the states. Index. \$7.50

The Machinery of the Body

New Fifth Edition

by Anton J. Carlson, Victor Johnson, and H. Mead Cavert. A classic in its field since it was originally published in 1937, this book has again been revised and enlarged, to include the most recent advances in medical knowledge and techniques. Emphasis on medical applications of fundamental physiological experimentations has been increased, and much important new material added such as: the meaning of "mechanism," chemistry of sugars and interconversion of fats, carbohydrates, and proteins; anticoagulant drugs; and the spectacular recent advances in heart surgery. The basic concept of the book remains the same . . . the changes are designed to give the work greater clarity, accuracy, and interest, to keep pace with rapidly advancing scientific methods and the increased understanding of physiology in the light of modern research. Illus. \$6.50

University of Chicago Press

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and 500 patients a year will be cared for under the program. The new Center is one of 8 cancer research units now being set up by the NCI in medical institutions across the country. The program director for the Cancer Research Center is Professor HENRY S. KAPLAN, executive of the department of radiology. Assistant professor MALCOLM A. BAGSHAW, director of the radiotherapy division of the department, will be deputy director.

S.U.N.Y. Brooklyn

Dr. HARLEY C. SHANDS has joined the State University of New York Downstate Medical Center as professor of psychiatry. Dr. Shands, who has been associate professor of psychiatry at the University of North Carolina School of Medicine, assumed his new post in August.

Dr. MEREL H. HARMEL, professor and chairman of the anesthesiology department, has been granted a year's leave by the university to work in the department of biochemistry at Oxford University, England. This department is headed by Sir HANS A. KREBS, who was awarded the Nobel Prize in Medicine and Physiology in 1953.

Fifteen high school biology teachers from New York City, Brooklyn, and the Bronx acquired a brief taste of medical school atmosphere this past summer while attending an intensive six-week workshop in experimental physiology at the Downstate Medical Center. The workshop was sponsored by the New York State Society for Medical Research under a special grant from the National Science Foundation. Dr. BRIAN F. HOFFMAN,

professor of physiology, directed the workshop.

University of Texas (Galveston)

The University of Texas Medical Branch is the only medical school that can probably claim the distinction of having its campus pictured on the cover of a telephone directory. The Southwestern Telephone Company chose an excellent aerial color shot of the buildings comprising the medical campus for the Galveston Telephone Directory's August, 1961 cover. Descriptive copy of the school's aims and activities appears on page one of the directory.

Dr. JOHN B. TRUSLOW, dean, reports that the cover has drawn so many favorable comments, together with requests for pictures, that the telephone company has arranged for suitable reprints.

West Virginia

Dr. THOMAS A. LOFTUS has been appointed professor and chairman of the department of psychiatry. Dr. Loftus comes from Jefferson Medical College where he has been associate professor of psychiatry. With this appointment all of the clinical department chairmanships have been filled in this new four year school.

An award of \$151,950 from the National Institutes of Health for the establishment of a clinical center for metabolic studies has just been received. These interdisciplinary studies will be coordinated by Dr. EDMUND B. FLINK, professor and chairman of the department of medicine, and Dr. BERNARD ZIMMERMANN, professor and chairman of the department of surgery.

from the National Institutes of Health

Thirteen New Grants Awarded For Clinical Research Centers

Thirteen new General Clinical Research Centers at 12 medical schools and one hospital in 10 states and the District of Columbia will be established with grants totalling almost \$4 million recently awarded by the Division of General Medical Sciences, NIH.

These grants will bring to 32 the number of General Clinical Centers established since the program was initiated in the fall of 1959 at the direction of the Senate Appropriations Committee. The program is aimed at an enlargement and intensification of clinical research in a broad spectrum of diseases. Grants awarded to date total \$11 million.

The 13 institutions receiving the grants are: University of Arkansas Medical Center, University of Colorado School of Medicine, Georgetown University School of Medicine, Medical College of Georgia, Northwestern University Medical School, University of Chicago School of Medicine, State University of Iowa College of Medicine, Johns Hopkins University School of Medicine, Tufts-New England Medical Center, Boston, Mass., Albert Einstein College of Medicine of Yeshiva University, Montefiore Hospital, New York; University of Pittsburgh School of Medicine, and Marquette University School of Medicine.

NOTE: Readers desiring copies of publications mentioned in this section of *J. Med. Educ.*, may, unless otherwise noted, obtain them as well as additional information on any subject reported herein, by addressing their requests to the Office of Research Information, Room 115, Bldg. T-19, National Institutes of Health, Bethesda 14, Md.

Medical Schools to Get Grant Aid for Radiotherapy Programs

Acting to counter a growing shortage of both professional and technical radiotherapy personnel, the National Institutes of Health has revealed plans for an intensive long-range effort to improve and extend the application of radiation to the treatment of cancer.

A major program of grant support to medical schools and teaching hospitals qualified to participate in a comprehensive effort in radiotherapy research and training in basic science and clinical applications will be directed by the National Cancer Institutes.

Grants will help provide support for an institution's medical, nursing, technical and other staff assigned to the program, and for training stipends for physicians, medical students and other professional personnel. They may also be used to meet certain patient costs, to pay for needed radiotherapeutic equipment and certain building alterations necessary to accommodate research and training projects.

Dr. Ralph Knutti Named New Director of Heart Institute

Dr. RALPH E. KNUTTI, has been appointed director of the National Heart Institute, succeeding Dr. JAMES WATT, who has been named Chief of the Division of International Health in the Office of the Surgeon General, Public Health Service.

Dr. Knutti, a graduate of Yale University Medical College, is a native of Palo Alto, California. He has been in charge of extramural affairs, National Institute of Arthritis and Metabolic

Diseases, since 1951 and has been Associate Director for Extramural Programs of that Institute since 1960. Before coming to the National Institutes of Health he was engaged in pathology research and teaching at the Rockefeller Institute, New York, the University of Rochester and the University of Southern California.

Dr. Watt, who had been director of the Heart Institute since 1952, assumed his new duties September 11. In addition to directing the Division of International Health he will be the Surgeon General's chief assistant and counsellor on international health affairs.

During his ten years at NIH Dr. Knutti has directed large and rapidly growing programs of grants for research and training in the fields of arthritis and metabolic diseases, becoming, in the process, well known in academic and medical circles in the United States and abroad, especially for contributions to the advancement of medical education and training.

NIH Virologists Report on Exchange Mission to U.S.S.R.

Soviet medical science has a "terrific sense of competition" with the rest of the world and is quick to convert research successes to practical application. This is the opinion of three National Institutes of Health scientists recently returned from the U.S.S.R. where they spent a month visiting major infectious disease research centers.

The scientists, Dr. ROBERT J. HUEBNER, Dr. ALEXIS SHELOKOV, and Dr. ROBERT M. CHANOCK, all virologists on the staff of the National Institute of Allergy and Infectious Diseases at NIH, were members of the 1961 Infectious Diseases and Microbiological Exchange Mission to the U.S.S.R. Other members were Dr. WILLIAM MCD. HAMMON, University of Pittsburgh; Dr. FRED M. DAVENPORT,

University of Michigan; and Dr. EDWIN H. LENNETTE, California State Department of Health.

The NIH members of the mission reported verbally to colleagues at a recent seminar. They noted that medical research in the Soviet Union is methodically planned. National goals are established by the Academy of Medical Science in Moscow. Within this framework, however, the average Soviet scientist seemed to feel that he had sufficient freedom to pursue his studies, guided by the goals set by senior scientists of the Academy.

According to Dr. Huebner, Soviet scientists wonder how the United States achieves its medical successes without similar planning, although they recognize U. S. leadership in fields such as virology, in which their own programs are only about five years old, and are dependent on other nations for data stemming from basic research in the biological sciences.

The Soviets, with a strong interest in preventive medicine, are vigorously pushing vaccine development programs, Dr. Chanock reported. They have given extensive trials to a live-virus influenza vaccine, which they admit has drawbacks for application to pediatric medicine because of fever-producing reactions. Similar reactions have also been encountered with an adenovirus vaccine for respiratory infections.

Chemotherapy and Virus Programs Reorganized by Cancer Institute

Keeping pace with developments in two important areas of cancer research, the National Cancer Institute has reorganized its Cancer Chemotherapy National Service Center and the Viruses and Cancer Program.

A Virology Research Resources Branch has been set up to administer and develop further the NCI's program for

Published May, 1961: Volume 12

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stimulating studies of the possibility that viruses cause human cancer. The new unit will use contracts to support the development of special materials needed for virus-cancer research, such as tissue culture cell lines, virus detection agents special experimental animals, and normal and malignant human tissue, and will disseminate information about progress in the virus-cancer field. Dr. HARVEY I. SCUDDER has been appointed Branch Chief.

The CCNSC has been organized into six branches (listed with their chiefs): Drug Development, Dr. HOWARD W. BOND; Drug Evaluation, Dr. JOSEPH LEITER; Clinical, Dr. T. PHILLIP WAALKES; Endocrine Evaluation, Dr. ERWIN P. VOLLMER; Research Communications, Dr. JONATHAN L. HARTWELL; and Opera-

tions, GEORGE A. BRANDNER. In addition, a Biometrics Section, headed by Dr. EDMUND A. GEHAN, has been established.

Both the Viruses and Cancer Program and the CCNSC are under the supervision of Dr. STUART M. SESSOMS, Associate Director for Collaborative Research.

Advisory Councils Meet At NIH During November and December

The schedule of the year-end round of advisory council meetings at the National Institutes of Health has been announced. The councils, composed of eminent scientists drawn from non-Federal research institutions and citizens well-known and experienced in public affairs, meet three times annually to make recommendations for action upon the hundreds of applications for research

and training grants considered by the NIH. The schedule:

- Nov. 6-8, Health Research Facilities
- Nov. 6-8, Dental
- Nov. 18-20, Heart
- Nov. 20-22, Cancer
- Nov. 20-22, Health
- Nov. 27-29, Allergy and Infectious Diseases
- Nov. 27-29, Neurological Diseases and Blindness
- Nov. 30-Dec. 1-2, Mental Health
- Dec. 1-3, Arthritis and Metabolic Diseases

New Grants Program Speeds Psychotropic Drug Testing

A new approach to the problem of drug evaluation has been undertaken by the National Institutes of Health in a program to speed the development of new drugs to combat mental illness.

The new program provides support for early clinical evaluation of new drugs potentially useful in the treatment of psychiatric conditions and is a cooperative effort involving clinical investigators, pharmaceutical firms, and the Public Health Service. It was developed by the Psychopharmacology Service Center of the National Institute of Mental Health.

Evaluations are now underway at 19 public and university hospitals where drugs are being used to treat chronic mental patients otherwise unresponsive or inadequately responsive to current forms of therapy. About 75 new compounds are being studied in an effort to determine their effectiveness and the type of patients they will help.

Under the new program, selected scientists receive NIH grant support for the necessary staff to conduct more extensive and effective research programs. The hospitals provide the clinical facilities, and pharmaceutical firms supply the drugs.

Previously, most NIH support for the clinical evaluation of psychotropic drugs

was focused on controlled clinical trials of drugs on which preliminary evidence of clinical effectiveness was already gathered. The difficulty of getting this preliminary evidence, however, was such that clinical evaluations became a major bottleneck in drug development. The number of new compounds which showed promise in animal testing far outstripped the facilities for adequate clinical investigation. The newly enlarged program of clinical testing should speed them through evaluation procedures and into use in practice.

Two Neurology Training Films Available Now From NIH

Two training films, produced for the National Institute of Neurological Diseases and Blindness, and available on loan, illustrate techniques for conducting neurological examinations of the newborn infant and the one-year-old child.

The first film, entitled "Neurological Examination of the Newborn," depicts testing methods for assessing the condition of the nervous system at birth, and presents some of the normal and abnormal responses to these tests. The second, "Neurological Examination of the One Year Old," illustrates similar techniques for use with this age group.

The 30-minute, color and sound films (16 mm.) were prepared under the direction of Dr. RICHMOND PAINE, pediatric neurologist at Children's Hospital Medical Center, Boston. They are available on loan from the Information Office, NINDB, Bethesda, Md. Copies may also be obtained from the American Medical Association, Film Library, 535 North Dearborn Street, Chicago, Illinois, and the Audio Visual Section, Communicable Disease Center, PHS, Atlanta, Georgia.

Two New Publications Now Available from NIH

Parkinson's Disease—Hope Through

Research. More than 25,000, possibly as many as 43,000 new cases of Parkinson's disease occur in the United States each year, according to this pamphlet just issued by the National Institute of Neurological Diseases and Blindness. The publication is written primarily to inform and reassure victims of the disease—who now total at least 300,000—and their families. It notes that although no ideal medication for the disorder has been found, and surgery is effective only in certain selected cases, nevertheless research promises constant improvement in treatment methods.

Outpatient Psychiatric Clinics. This nationwide directory, published recently by the National Association for Mental Health in cooperation with the National Institute of Mental Health, reports that out-patient psychiatric services in the United States increased 16 per cent from 1956 to 1959. It lists all regularly scheduled clinics in which a psychiatrist has medical responsibility for the welfare of patients.

Single copies of both publications are available without charge from the Office of Research Information, Room 115, Bldg. T-19, National Institutes of Health, Bethesda 14, Maryland.

Survey Reveals Undergraduate Sources of NIH Research Grantees

Twenty colleges and universities, whose enrollments represent two per cent of

total U. S. college students, graduated (with bachelor's degrees) 18 per cent of the 1,900 scientists who were awarded new NIH research grants in 1960, according to a survey conducted by the NIH Division of Research Grants. The survey, an inquiry into the academic backgrounds of a sample group of 1,900 scientists, shows that certain U. S. schools stand out as undergraduate sources of scientist material.

Ranked in descending order, the top ten schools were: Haverford, University of Rochester, Amherst, Swarthmore, California Institute of Technology, University of Chicago, Princeton, Wesleyan, Reed, and Harvard. These schools, comprising one per cent of the U. S. college enrollment in 1959, were the undergraduate schools of 11 per cent of the scientists surveyed.

The second group of ten schools, also in descending order, were: Bowdoin, Bates, Yale, Clark, Franklin and Marshall, Pomona, Dartmouth, Loyola (Chicago), Stanford, and Wellesley. These schools accounted for seven per cent of the scientists surveyed.

Only four of the 20 schools have enrollments over 4,000, and none ranked among the 25 largest in 1959. The four: Harvard, with 11,000; Stanford, 8,400; Yale, 7,800; and the University of Chicago, 6,800. The remaining 16 have enrollments ranging from 450 to 3,700, with an approximate average of 1,400.

Items of Current Interest

New York City Plans to Build Medical School

A new medical school for New York City is under official consideration and has the full support of Mayor Wagner. It would be the only city-operated medical school. Announcement coincided with a request recently by the City Planning Commission for 1,000 new general hospital beds for The Bronx. The location of 700 of these beds will depend on development of the new medical school, the Mayor announced, disclosing that he had written to Gov. Rockefeller offering to coordinate city and state planning on medical education.

Noting that the state had also been considering the construction of a new medical school in the metropolitan area, the Mayor indicated that the city in that case may get two new medical schools. He emphasized however that the city would proceed with its own plan to build a school "if the state does not elect to coordinate its plans for medical education with ours."

American Heart Association Forms New Dental-Medical Education Committee

The American Heart Association has announced the formation of a Committee on Dental-Medical Education. The new group, a subcommittee of the Association's Committee on Professional Education, will concern itself with problems involving cardiovascular patients. These include the prophylactic use of antibiotics for patients who require dental manipulative procedures and the use of local anesthetics for those receiving anticoagulant, antihypertensive and diuretic drugs for cardiac conditions.

Chairman of the Committee is Dr. LESTER W. BURKET, Dean of the University of Pennsylvania Dental School. Serving with him are Dr. THOMAS L. LOUDEN, Washington, D. C., who is also acting as liaison representative for the Heart Disease Control Program of the Public Health Service; Dr. HENRY D. MCINTOSH, associate professor of medicine, Duke University School of Medicine—also serving as liaison for the American Dental Association; Dr. J. ROY DOTY of Chicago; and Dr. J. PAUL GUIDRY of Kirkwood, Mo.

Thyroid Association Offers Van Meter Prize

The American Thyroid Association, Inc., again offers the Van Meter Prize Award of \$500.00 to the essayist submitting the best manuscript of original and unpublished work concerning "Goiter—especially its basic cause." The studies so submitted may relate to any aspect of the thyroid gland in all of its functions in health and disease. The Award will be made at the Annual Meeting of the Association to be held May 9-12, 1962 in New Orleans, La.

Further information may be obtained by writing to Dr. Theodore Winship, 430 N. Michigan Ave., Chicago 11, Ill. Essays will not be accepted after January 1, 1962.

Tuberculosis Association Grants Fellowships

Eighteen young doctors will have training in the teaching of respiratory diseases under fellowships awarded for the current academic year by the National Tuberculosis Association. In addition to the teaching fellowships, the NTA has

awarded eight research fellowships to enable graduate students to conduct research studies under established investigators.

Nutrition Board Sets Exam Date

The American Board of Nutrition will hold the next examination for certification as a Specialist in Human Nutrition on Sunday, April 8, 1962 in Atlantic City, N. J. Candidates who wish to be considered for these examinations should forward applications to the Secretary's office not later than March 1. Application forms may be obtained from Dr. Robert E. Shank, Dept. of Preventive Medicine, Washington University School of Medicine, Euclid and Kingshighway, St. Louis 10, Mo.

Dr. Moises Behar Elected New INCAP Director

Dr. MOISES BEHAR of Guatemala, a specialist on malnutrition in children, has been elected the new Director of the Institute of Nutrition of Central America and Panama. He succeeds his former Chief, Dr. NEVIN S. SCRIMSHAW of the United States. Since 1957 Dr. Behar has been INCAP's Assistant Director and chief of its Division of Clinical Research.

Army Deputy Surgeon General to Retire, Successor Named

The Secretary of the Army has announced the retirement on Sept. 30, of Major General T. J. HARTFORD, the Deputy Surgeon General, after more than 30 years of active duty. He will be succeeded by Brigadier General HOWARD W. DOAN, currently the Army Surgeon General's Director of Personnel and Training. As Deputy, Gen. Doan will assist the Army Surgeon General in supervising and coordinating the world-wide activities of the Army Medical Service.

VA's Dr. Walkup to American Thoracic Society

Dr. HARRY E. WALKUP, assistant director of surgical service for the Veterans Administration in Washington, D. C., will leave the VA to become director of research for the American Thoracic Society, medical arm of the National Tuberculosis Association in New York City, Sept. 1.

Dr. Walkup has been with the VA since 1946. Before his appointment as assistant director of surgical service in Feb. 1961, he was the Oteen, N. C., VA hospital's chief of surgical service and assistant director of professional service for research.

PERSONNEL EXCHANGE

Faculty Vacancies

INTERNIST: To direct Pulmonary Disease Section of a large general hospital closely affiliated with medical school. Faculty appointment. Broad clinical, research, and teaching opportunities. Active Pulmonary Function Laboratory. Contact: Chief, Medical Service, V.A. Hospital, Albany, N. Y.

MEDICAL SERVICES DIRECTOR: To have full charge of all medical and surgical activities for Kern County General Hospital System, under administrative direction of Hospital Administrator; direct and coordinate medical services, supervise operation of intern and resident teaching programs. M.D. degree from approved medical school, approved internship, completion of approved residency and three years experience in practice of medicine, two years of which must have been in teaching or supervisory capacity. Certification by an American Board, California M.D. license. Salary \$15,228 to \$18,504 annually. Write to: C. Leon Bryson, Kern County General Hospital, 1830 Flower St., Bakersfield, Calif.

RADIOLOGIST: To assist staff radiologist in operation of X-ray department at Kern General Hospital including supervision of technical employees, assisting in resident physician training. Active department. Possession of valid license to practice medicine in California required; certification or eligibility for certification by American Board of Radiology is desirable. Salary \$11,928 to \$14,508. Write to: Kern County General Hospital, 1830 Flower Street, Bakersfield, Calif.

MEDICAL EDUCATION DIRECTOR: Board Certified or comparable to requirements for Board Certification to direct an approved internship and residency program. Two hundred sixty-six bed community hospital with medical school affiliation in University City. Write and include curriculum vitae: Arthur V. Crandall, Administrator, Brackenridge Hospital, Austin, Texas.

EPIDEMIOLOGIST: A newly established, full-time faculty position now available. Candidates with medical degree preferred. Background and experience in epidemiology and biostatistics required; background in infectious disease studies with overseas field experience desirable. Duties will include organizing and directing training program in epidemiology and biometrics at a World Health Training Center now under development at this medical school. Opportunities will be available for field studies at overseas base. For further information, contact George Entwistle, M.D., Chairman, Department of Preventive Medicine and Rehabilitation, University of Maryland School of Medicine, Baltimore 1, Md.

MEDICAL EDUCATION COORDINATOR: Progressive general hospital in East desires full-time M.D. to coordinate expansion of educational program for interns and residents; educational potentialities unlimited; abundant service patients; 40 Boarded specialists representing all fields; research program contemplated; cardiac catheterization under development. Address: Paul G. Wedel, Administrator, The Williamsport Hospital, 777 Rural Avenue, Williamsport, Pa.

BACTERIOLOGIST: University Hospital has a vacancy for a medically qualified bacteriologist. Appointment also carries a university teaching position. Salary \$10,000-\$14,000 per annum. Applicants should have hospital experience. Applications stating date of birth, qualifications, experience, present appointment, and the names of three references should be sent to the Director of Bacteriology, University Hospital, Saskatoon, Saskatchewan, Canada.

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MEDICAL TECHNOLOGIST: ASCP Registered medical technologist (female) with Bachelor's degree and 2 years experience to work in curriculum of medical technology, department of pathology. Position is chiefly assisting in administration and teaching. Salary open, dependent upon qualifications. Reply: Dr. J. F. Kusma, Director of Department of Pathology, Marquette University School of Medicine, Milwaukee 3, Wis.

MEDICAL LIBRARIAN: University desires Medical Librarian at an initial salary of \$6,500. The successful candidate will receive faculty status equivalent to that of departmental chairman in the Faculty of Medicine. Duties will include full responsibility for the administration of the Medical Library. Minimum qualifications must include the Medical Library Association Grade I certificate, or its equivalent, with some experience in library administration. Applications should be addressed to the Chief Librarian, Macdonald Memorial Library, Dalhousie University, Halifax, Nova Scotia.

BIOCHEMIST: Junior staff position open in expanding biochemistry department of mid-western medical school. Teaching and research. Opportunity for advancement. Salary competitive. Valuable fringe benefits. Address: V-112.

PHYSICIANS: County hospital affiliated with three medical schools, desires qualified full-time physicians for intern and resident teaching and patient care responsibilities in following fields: internal medicine, general surgery, pediatrics, psychiatry, obstetrics and gynecology, radiology, forensic pathology, director of out-patient clinic, and physician experienced in rehabilitation to direct long term medical care program. All starting salaries over \$14,000. Include curriculum vitae with inquiry to: F. G. Gillick, M.D., Santa Clara County Hospital, San Jose-Los Gatos Road, San Jose 28, Calif.

PATHOLOGIST: Board certified or Board eligible pathologist for position combining hospital pathology, teaching in school of medicine and research. Applicant should be interested in both clinical pathology and pathologic anatomy. Compensation and rank dependent upon qualifications. For further information address: Theodore L. Perrin, M.D., The Creighton University School of Medicine, 302 N. 14th St., Omaha 2, Nebr.

ANATOMIST: Two positions open; one in gross and one in neuroanatomy. The Ph.D. required in Anatomy, or in Biology with practical experience. Salary and working conditions good; research field optional. Address: V-113.

PHYSIOLOGIST: Full-time appointment. Gastroenterologist or neurophysiologist preferred. Teaching responsibilities with medical, dental, pharmacy, or graduate students; conduct independent research program. Stimulating environment. Rank and salary based on qualifications. Address V-114.

DIRECTOR OF MEDICAL EDUCATION: Full-time for 263-bed regional medical center; progressive midwestern city of 130,000; cooperative medical staff with strong teaching interests and qualifications; long history of community support and emphasis on education. Salary open. Write to: S. F. Masson, Director, Rockford Memorial Hospital, 2400 N. Rockton Ave., Rockford, Ill. Enclose curriculum vitae.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request. Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

MICROBIOLOGIST: Ph.D. Many years experience in clinical bacteriology and mycology. Excellent background in parasitology and virology. Well qualified in many phases of public health microbiology. Medical school and A.S.C.P. teaching experience as well as administrative responsibilities. Publications. Desires challenging appointment in medical school. Address: A-488.

ANATOMIST: Ph.D. Male, age 43. Fifteen years teaching experience. Currently assistant professor teaching neuroanatomy and gross anatomy in school of medicine and dental medicine. Also experienced in histology and physiology. Trained in educational methods and testing. Desires opportunity for teaching and research in anatomy department or in a correlated pre-clinical medical program. Address: A-489.

MEDICAL PHOTOGRAPHER: A.B., age 35. Ten years experience in medical photography (including 7 years with Veterans Administration). Special training in photomicrography. Fluent knowledge of German. Desires position with medical school and/or hospital affiliated with medical school. Good references. Resumé and references on request. Address: A-491.

PHYSIOLOGIST: Ph.D., assistant professor. Long-term research program with staff of four based on continuing large N.I.H. grants. Basic and clinical aspects of endocrine physiology. Major physiology teaching responsibilities and experience. Seeks associate professorship in physiology. Address: A-493.

PHARMACOLOGIST: M.D., Punjab University, India. Age 27, married, one child. Publications, *Ind. J. Med. Sc.* and *J. Am. Pharm. Assn.* Presently research assistant, department of pharmacology, University of Agra. Desires position with U.S. medical school with opportunity for postdoctoral study. Address: A-494.

PSYCHIATRIC SOCIAL WORKER: M.A., The University of Chicago. Desires position in medical school, department of psychiatry. Fourteen years experience in teaching medical students in two medical schools as well as administrative and supervisory experience. Address: A-495.

BIOPHYSICIST-PHYSIOLOGIST: Ph.D., M.S., E.E., wishes faculty appointment, teaching and research. Publications, books. Areas of research interest—bioelectric studies, origins of congenital heart disease, biomedical engineering. Address: A-496.

PHYSIOLOGIST-PHARMACOLOGIST: Ph.D., faculty member of medical school. Teaching experience. Research in endocrine physiology and pharmacology of endocrine preparations. Publications and Society memberships. Desires teaching and/or research position with opportunity for independent research. Address: A-497.

MICROBIOLOGIST-IMMUNOLOGIST: Research and teaching experience in bacteriology and parasitology. Presently on medical school faculty. Desires faculty appointment appropriate for qualifications with opportunity for independent research. Would also consider a position in a medical foundation or in a City, County, or Federal Institution affiliated with a medical school. Address: A-498.

PREVENTIVE MEDICINE-PUBLIC HEALTH: Physician with M.D., Dr.P.H. degrees desires senior teaching position on medical school or public health school faculty. Numerous publications. Previous research, teaching, administrative and health department experience. Special interests are epidemiology, preventive medicine, and biostatistics. Address: A-499.

INTERNIST: M.D., M.S. in Med. Certified. Age 46. Wishes to abandon lucrative private practice of 18 years for full-time (or half-time) medical school appointment that includes teaching, OPD, and hospital practice. Extensive clinical experience and original publications in psychosomatic medicine. Capable of organizing and heading a psychosomatic division that will integrate general medicine and psychiatry. Address: A-500.

ANATOMIST: Ph.D. (Anatomy) March 1961. M.S. in Zoology and B.S. in Biology. Age 39, married, child. Presently teaching biology in midwest. Prefers return to anatomy since Ph.D. completed. Twelve years full-time teaching experience, including four in anatomy (histology, embryology, gross, comparative, and neurology). Publications. Research interests in histochemical aspects of mammalian development; program in progress. Prepared to contribute to graduate research training programs. References. Address: A-501.

PHYSIOLOGIST: Ph.D., age 39. Desires faculty appointment, teaching and research. At present associate professor of physiology in medical school. Teaching experience and research in respiratory physiology and neuropharmacology. Salary open. Address: A-502.

PHYSIOLOGIST: Ph.D., age 41. Also E.E. degree in electronics. Wide experience in cardiopulmonary and cardiac electrophysiology as well as medical instrument design. Member of American Physiological Society and Institute of Radio Engineers, etc. Assistant professor of physiology. Seeks faculty position in medical school or in a cardiopulmonary laboratory associated with teaching and research. Address: A-503.

PREVENTIVE MEDICINE: M.D., certified in internal medicine and in a subspecialty, desires position in university department of occupational medicine or preventive medicine. Trained at Mayo Clinic and in university. Experience includes clinical investigation, medical school faculty and private practice. Address: A-504.

PATHOLOGIST: Age 39; Certified (FCAP 1961). Also three years internal medicine. Experienced director of hospital laboratory and director, school of medical technology. Experienced in new laboratory designing. Extensive work in all fields of medical education, recruiting, all medical specialties, research personnel. Interested in cancer research etiology, early diagnosis, genetics, especially leukemias and lymphomas. Prefer establishing laboratories and programs in organizations or institutions, new or in building process. Address: A-505.

BIOCHEMIST: Ph.D., age 50. Will resign as research director of small drug firm for teaching-research appointment. Some medical school teaching experience early in career, but can offer extensive experience to teaching, to research (lipid metabolism; nutrition), and to cooperative projects with clinical and preclinical associates. Desires research or career professorship. Prefers no administrative duties. Address: A-506.

ALLERGIST: Age 40, board certified in allergy and pediatrics. Currently teaching part-time. Seeking full-time teaching position. Address: A-507.

DEVELOPMENT CONSULTANT OR ADMINISTRATOR: Desires position as consultant or administrator for new medical school establishment, or expansion of approved school. Fund raising background capped by six years as Executive Secretary, A.M.E.F. Recently launched program for new Saint Paul Medical School. Address: A-508.

PHARMACOLOGIST-ADMINISTRATOR: Ph.D., age 38. Ten years administrative, teaching and industrial research experience including international as well as Stateside assignments. Research interests in industrial toxicology, neuropharmacology and screening procedures. Teaching experience includes medical, dental, nursing, graduate and postdoctoral duties. Interested in academic administrative post, research coordination and graduate education. Available early in 1962. Address: A-509.

MEDICAL ADMINISTRATOR: M.D., Ph.D. in neurophysiology, neuropharmacology. Experience in administrative clinical research post. Some teaching experience. Strong interest in medical education. Desires either a full-time medical college administrative post or combined with basic science teaching position in physiology or pharmacology. Address: A-510.

INTERNIST: Age 43, board-certified with subspecialty interest in gastroenterology. Extensive teaching and administrative background. Interested in change of location, preferably to the northern half of U.S. Interests predominantly clinical and teaching with some research. Address: A-511.

PEDIATRICIAN: M.D., M.P.H., age 35. Certified pediatrician, with five years experience in pediatrics and pediatric allergy, teaching and staff duties at community hospitals and metropolitan teaching hospital. Seeking administrative position. Address: A-512.

PHYSIOLOGIST-BIOCHEMIST: Ph.D., age 32. Present rank assistant professor. Experienced with isotopic and biochemical techniques applied to basic problems in endocrinology, metabolism, and cellular physiology. Publications and societies. Extensive teaching experience. Desires career faculty appointment in physiology or biochemistry with opportunity for independent research. Available Spring 1962. Address: A-513.

PEDIATRICIAN: Diplomat; teaching experience; publications. Desires faculty appointment in U.S. medical school. Presently located in Canada. Address: A-514.

MICROBIOLOGIST-INTERNIST: M.D., Ph.D. Qualified medical scientist, age 46, desires full-time position as Chief, Division Infectious Disease and/or Head, Microbiology Department of medical school with associated rank in internal medicine. Experienced in teaching, administration and medical practice. National Science Foundation grants; 50 research publications, one book. Eastern location preferred. Address: A-515.

PHYSIOLOGIST: M.B.B.S. (Bombay, India), M.D.; age 34. Seven years teaching experience as lecturer in Bombay medical college. Present position, assistant professor of physiology. Seeking position in U.S. medical school, involving research with opportunity for earning Ph.D. degree in U.S.A. or Canada. Address: A-516.

ANATOMIST: M.B.B.S.; M.Sc. (Med.). Age 45. Thirteen years teaching experience in anatomy, Bombay medical college. Currently assistant professor of anatomy. Also experience in histology. Desires faculty position as professor or assistant professor of anatomy or histology or in a correlated preclinical teaching program. Address: A-517.

GENERAL SURGEON: With urological and gynecological training. American by birth, presently located in England. New York State license; trained in England and U.S. Holds the F.R.C.S., Eng., and Ch.M. Desires academic position in department of surgery, with opportunity for cancer research as well as routine surgery. Address: A-518.

SURGEON: Head and neck, and general plastic-reconstructive. Age 34; currently finishing two-year plastic surgery residency, with 3½ years otolaryngology and bronchoesophagology, and 3 years surgery (incl. 18 months in the head and neck surgery service) background. Desires one year assistantship, or fellowship, or preceptorship or academic position in either head-neck or plastic-reconstructive surgical fields or both beginning July 1, 1962. Address: A-519.

GENERAL SURGEON: Age 34, Board Certified. Now in full-time hospital position and faculty appointment. Desires new faculty position with private practice privileges or association in surgical group. Address: A-520.

ANESTHESIOLOGIST: Age 35, Board Certified, AOA. Currently associate professor, experienced in teaching, administration, research, and organizing new departments. Desires to plan, build and chair department of anesthesiology in new medical school, with opportunity to organize surgical-anesthesiological facilities and other portions of new teaching hospital. Southwestern or southern location preferred. Address: A-521.

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How to buy \$25 bills for \$18.75

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You save more than money
with U.S. Savings Bonds



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Sobee has the rich, creamy appearance that mothers expect of a formula. Sobee is pleasantly bland, without the "burned-bean" flavor or chalky aftertaste frequently associated with a soya formula.

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1. Kane, S.: *Am. Pract. & Digest Treat.* 8:65 (Jan.) 1957.

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